



F2 Labs
16740 Peters Road
Middlefield, Ohio 44062
United States of America
www.f2labs.com

CERTIFICATION TEST REPORT

Manufacturer: QRC Technologies, A Parsons Company
1191 Central Park Boulevard
Fredericksburg, Virginia 22401 USA

Applicant: Same as Above

Product Name: BlueFly

Product Description: BlueFly is a personal smart device locator, capable of detecting devices emitting BLE, Bluetooth BR/EDR, or Wi-Fi. It is a low SWAP/low-cost device and is a commercial drone mountable sensor capable of detecting a range of IoT signals including BLE, Bluetooth BR/EDR and Wi-Fi. The sensor incorporates a GNSS receiver and a long-range wireless communication transceiver (LORA) for independent geolocation and control. Users will interact with the sensor through a CivTak plugin (Android app).

**Operating Voltage/Freq.
of EUT During Testing:** Battery-Operated (5VDC)

Model: BlueFly

FCC ID: 2BHXO-Q1700

Testing Commenced: 2025-06-19

Testing Ended: 2025-09-22

Summary of Test Results: In Compliance, with Modifications

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Rules:

- **FCC Part 15 Subpart C, Section 15.247**
- **FCC Part 15.31(e)**
- **ANSI C63.10:2020**



Order No(s): F2P34169B

Applicant: QRC Technologies, A Parsons Company
Model: BlueFly

Evaluation Conducted by:

Erik Tobin, EMC Engineer

Report Reviewed by:

Ken Littell, Vice President of Operations

F2 Labs
26501 Ridge Road
Damascus, MD 20872
Ph 301.253.4500

F2 Labs
16740 Peters Road
Middlefield, OH 44062
Ph 440.632.5541

F2 Labs
8583 Zionsville Road
Indianapolis, IN 46268
Ph 317.610.0611

This test report may be reproduced in full; partial reproduction only may be made with the written consent of F2 Labs. The results in this report apply only to the equipment tested.



TABLE OF CONTENTS

1	<u>ADMINISTRATIVE INFORMATION</u>
2	<u>SUMMARY OF TEST RESULTS/MODIFICATIONS</u>
3	<u>TABLE OF MEASURED RESULTS</u>
4	<u>ENGINEERING STATEMENT</u>
5	<u>EUT INFORMATION AND DATA</u>
6	<u>LIST OF MEASUREMENT INSTRUMENTATION</u>
7	<u>OCCUPIED BANDWIDTH</u>
8	<u>CONDUCTED OUTPUT POWER</u>
9	<u>CONDUCTED SPURIOUS EMISSIONS</u>
10	<u>RADIATED SPURIOUS EMISSIONS</u>
11	<u>PEAK POWER SPECTRAL DENSITY (PSD)</u>
12	<u>TEST SETUP PHOTOGRAPHS</u>



1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to ANSI C63.10 and recommended FCC procedure of measurement under Section 15.247 and in KDB558074. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	±5.07dB	±2.54dB
Radiated Emissions <1 GHz @10m	±5.09dB	±2.55dB
Radiated Emissions 1 GHz to 2.7 GHz	±3.62dB	±1.81dB
Radiated Emissions 2.7 GHz to 18 GHz	±3.10dB	±1.55dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	±2.76dB	±1.38dB

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P34169B-01E	First Issue	2025-09-29	K. Littell



2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
Occupied Bandwidth	CFR 47 Part 15.247(a)(2) / KDB558074	Complies ²
Conducted Output Power	CFR 47 Part 15.247(b)(2) / KDB558074	Complies
Voltage Variations	CFR 47 Part 15.31(e)	Complies ¹
Conducted Spurious Emissions	CFR 47 Part 15.247(d) / Part 15.207 / KDB558074	Complies
Radiated Spurious Emission with -1.73dBi Gain Integral Antenna	CFR 47 Part 15.247(d) / Part 15.209 / KDB558074	Complies
Peak Power Spectral Density	CFR 47 Part 15.247(e) / KDB558074	Complies ³
Frequency Separation	ANSI 63.10 2013 (7.8.2)	N/A
Number of Hopping Frequencies	ANSI 63.10 2013 (7.8.3)	N/A
Dwell Time	ANSI 63.10 2013 (7.8.4)	N/A
Conducted Emissions	CFR 47 Part 15.207(a)	N/A

¹Requirements of 15.31 were met by using new batteries.

Modifications Made to the Equipment
²The following modification was made to meet Occupied Bandwidth requirements: Radio bandwidth changed from 250 to 500kHz. ³The following modification was made to meet Power Spectral Density requirements: Radio power was lowered – HPMax code changed from 07 to 03.



3 TABLE OF MEASURED RESULTS

Test	Low Channel 903 MHz	Mid Channel 914.2 MHz	High Channel 927.5 MHz
Conducted Output Power	36.644mW / 15.64dBm	35.975mW / 15.56dBm	34.995mW / 15.44dBm
Conducted Output Power Limit	1 Watt / 30dBm	1 Watt / 30dBm	1 Watt / 30dBm
E.I.R.P. with -1.73dBi Gain Integral Antenna	24.604mW / 13.91dBm	24.155mW / 13.83dBm	23.496mW / 13.71dBm
E.I.R.P. Limit	4 Watts / 36.02dBm	4 Watts / 36.02dBm	4 Watts / 36.02dBm
-6dB Occupied Bandwidth	639.7kHz	628kHz	631kHz
99% Occupied Bandwidth	503.2kHz	503.2kHz	509.6kHz
Occupied Bandwidth Limit	≥ 500KHz	≥ 500KHz	≥ 500KHz
Peak Power Spectral Density	5.87dBm	4.94dBm	4.27dBm
Peak Power Spectral Density Limit	8dBm	8dBm	8dBm



4 ENGINEERING STATEMENT

This report has been prepared on behalf of QRC Technologies, A Parsons Company to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 of the FCC Rules using ANSI C63.10 and KDB558074 standards. The test results found in this test report relate only to the items tested.



5 EUT INFORMATION AND DATA

5.1 Equipment Under Test:

Product: BlueFly
Model(s): BlueFly
Serial No.: 6004-0002
FCC ID: 2BHXO-Q1700



5.2 Trade Name:

QRC Technologies, A Parsons Company

5.3 Power Supply:

Battery-Operated (5VDC)

5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

5.5 Antenna:

Integral Antenna

5.6 Accessories: None

5.7 Test Item Condition:

The equipment to be tested was received in good condition.

5.8 Testing Algorithm:

LoRa radio set to continuously transmit the modulated carrier at 903, 914.2 and 927.5 MHz. The highest emissions were recorded in the data tables.

**6 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166	Albatross Projects	B83117-DF435-T261	US140023	2026-05-07
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2026-04-09
Pre-Amplifier	CL153	Keysight Tech.	83006A	MY39500791	2025-12-04
Low Loss Cable Set	CL315 / CL318	Fairview Microwave	FMC0202914-72/FMC0202914-240	None Spec.	2026-04-09
Antenna, Horn	CL098	Emco	3115	9809-5580	2026-01-21
Pre-Amplifier	CL284	A.H. Systems, Inc.	PAM-0101	131	2026-04-08
Active 18" Loop Antenna	CL163-Loop	A.H. Systems, Inc.	EHA-52B	100	2026-04-01
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2025-09-18
Software:	Tile Version 3.4.B.3		Software Verified: 2025-06-19 to 2025-07-01		
Software:	EMC 32, Version 8.53.0		Software Verified: 2025-06-19 to 2025-07-01		
Temp/Hum Rec	CL327	Thermpro	TP50	8	2028-03-20



7 OCCUPIED BANDWIDTH

7.1 Requirements:

The 6dB bandwidth shall be greater than 500 kHz.

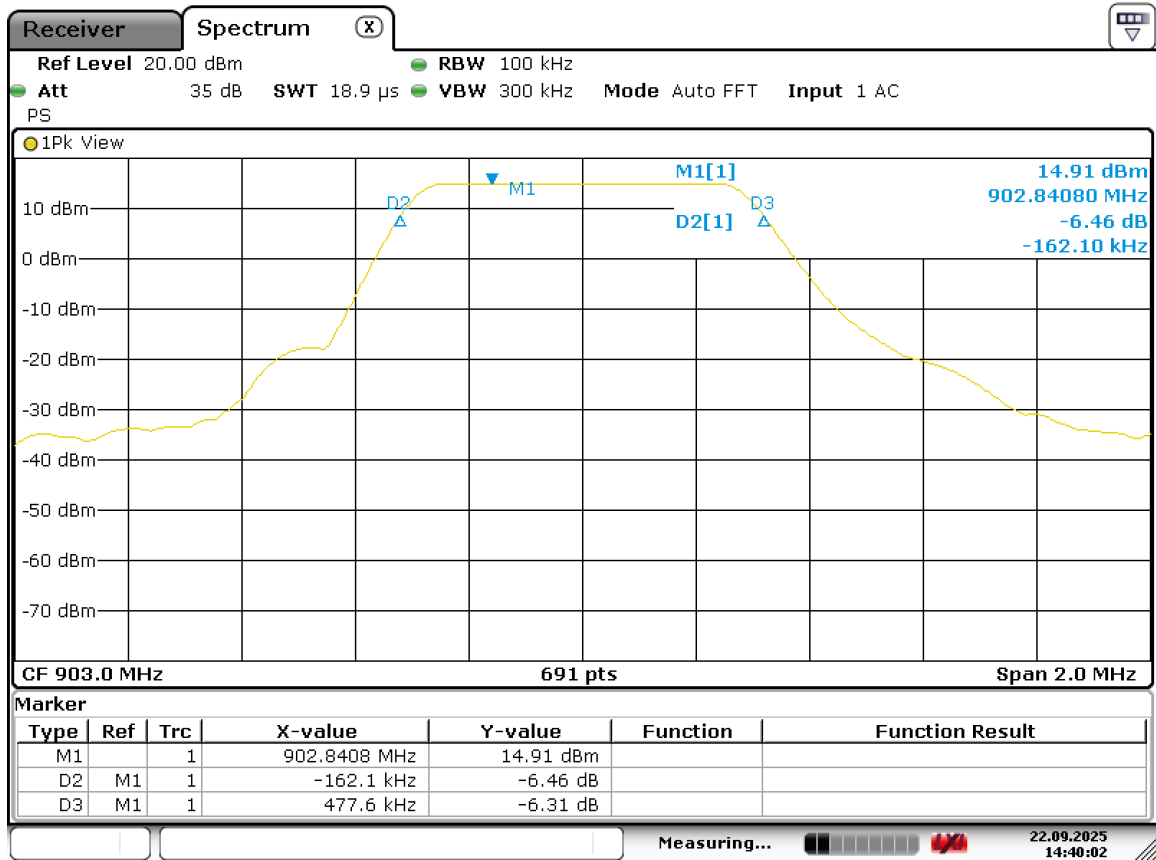
Bandwidth measurements were made at the low, mid and high frequencies with the Resolution Bandwidth set at 30 kHz (video bandwidth set at 100 kHz) for the 99% OBW, and 100kHz Resolution Bandwidth and 300kHz Video Bandwidth for the -6dB OBW. The span was set at 5 MHz. The bandwidth was measured using the analyzer's marker function.



7.2 Occupied Bandwidth Test Data

Test Date:	2025-07-01 to 2025-09-22	Test Engineer:	E. Tobin
Standard(s):	CFR 47 Part 15.247(a)(2); KDB558074	Air Temperature:	22.0°C
		Relative Humidity:	52%

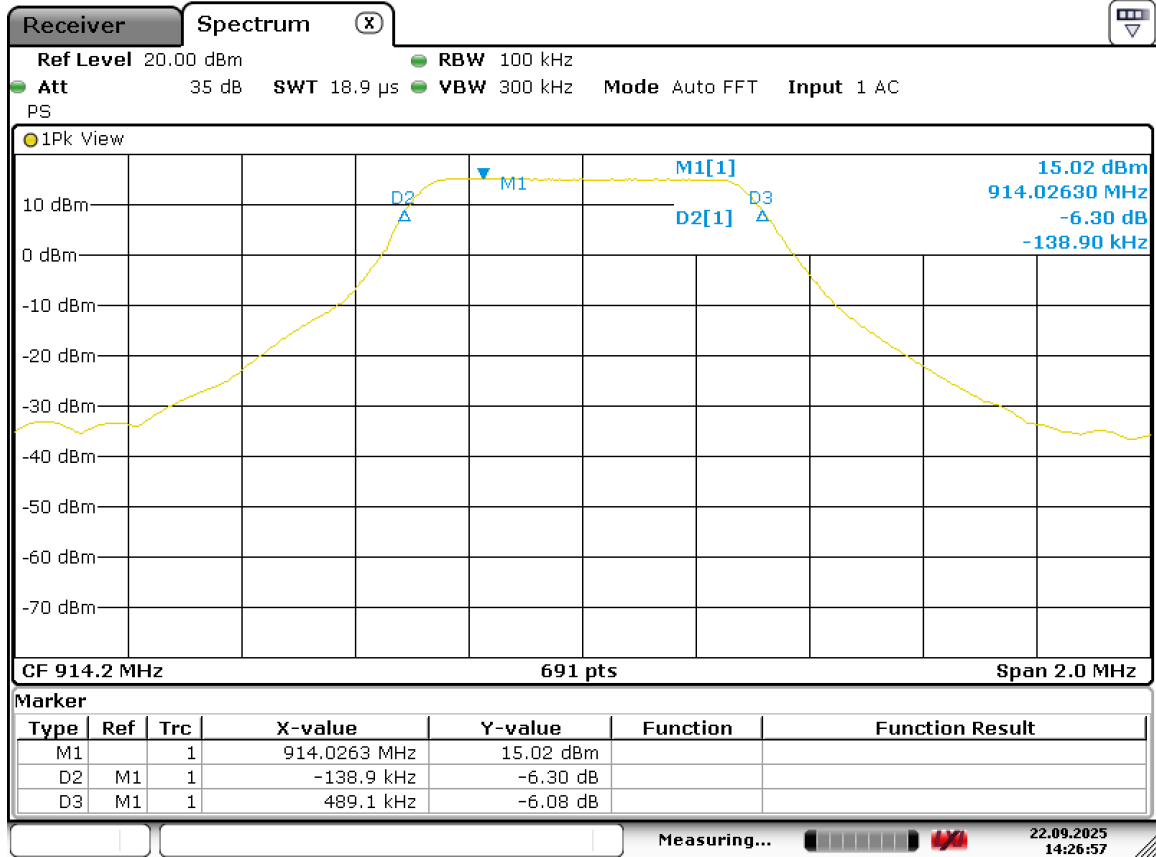
-6dB: Low Channel



Date: 22.SEP.2025 14:40:02



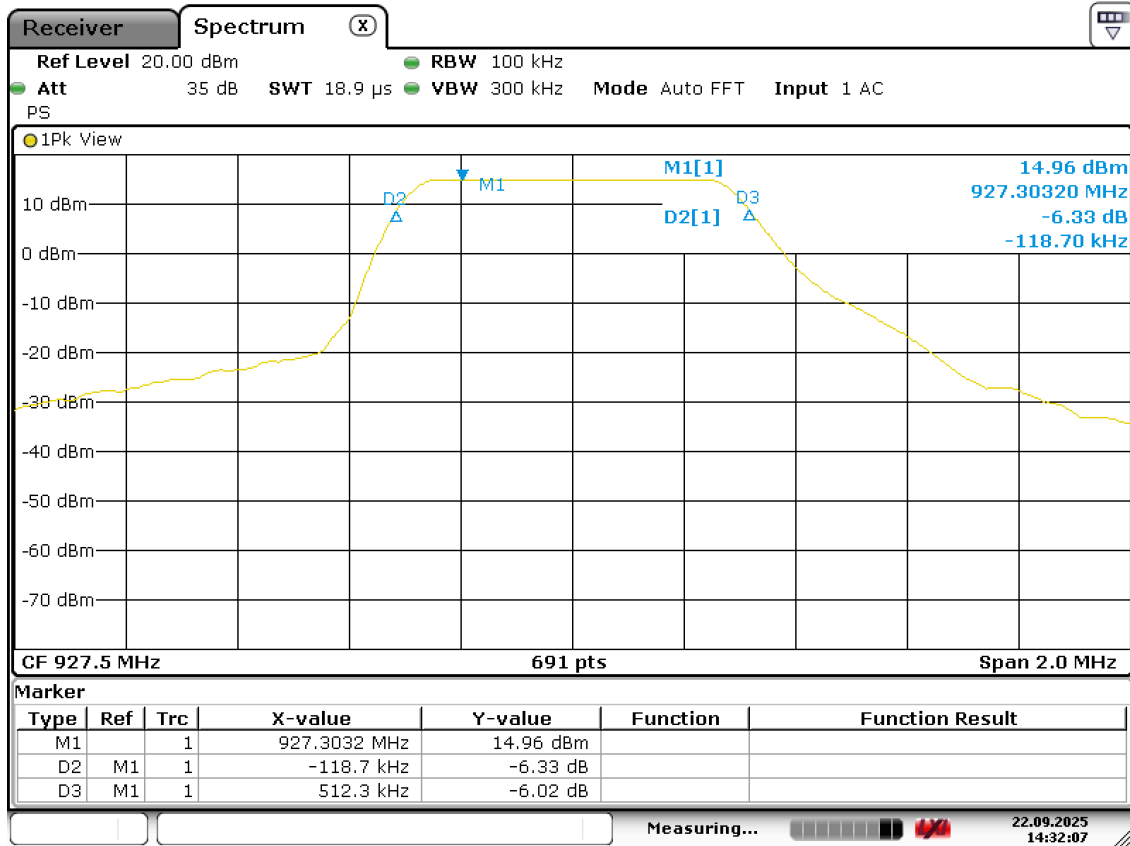
-6dB: Mid Channel



Date: 22.SEP.2025 14:26:57



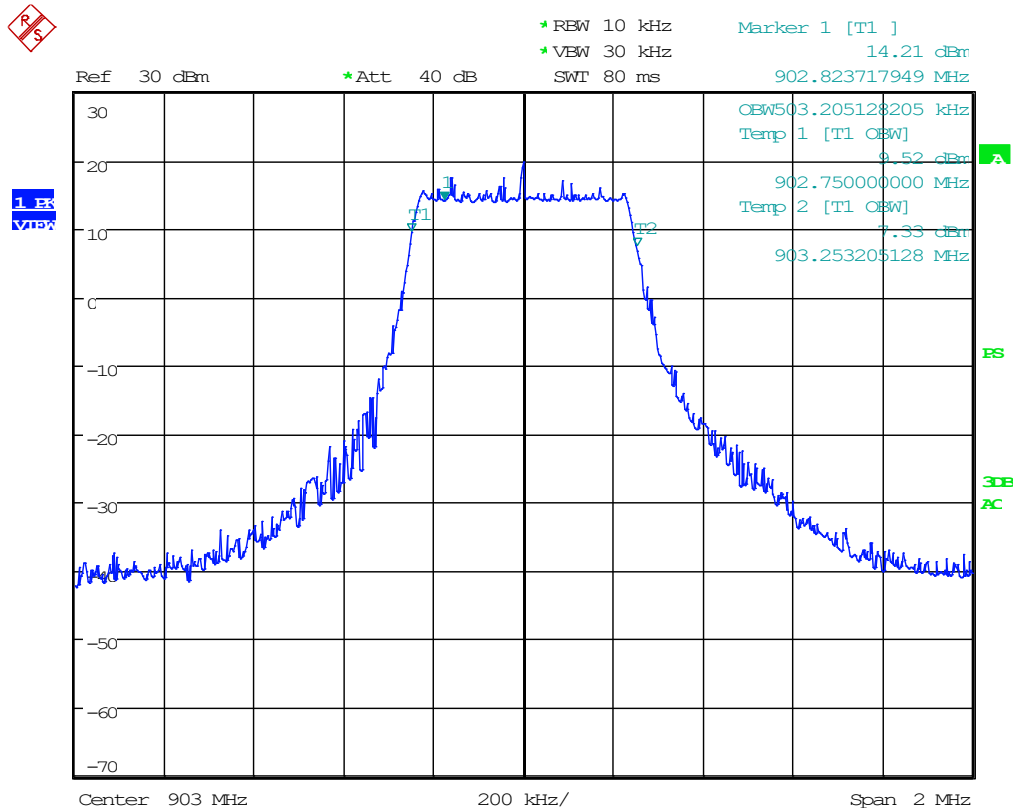
-6dB: High Channel



Date: 22.SEP.2025 14:32:07



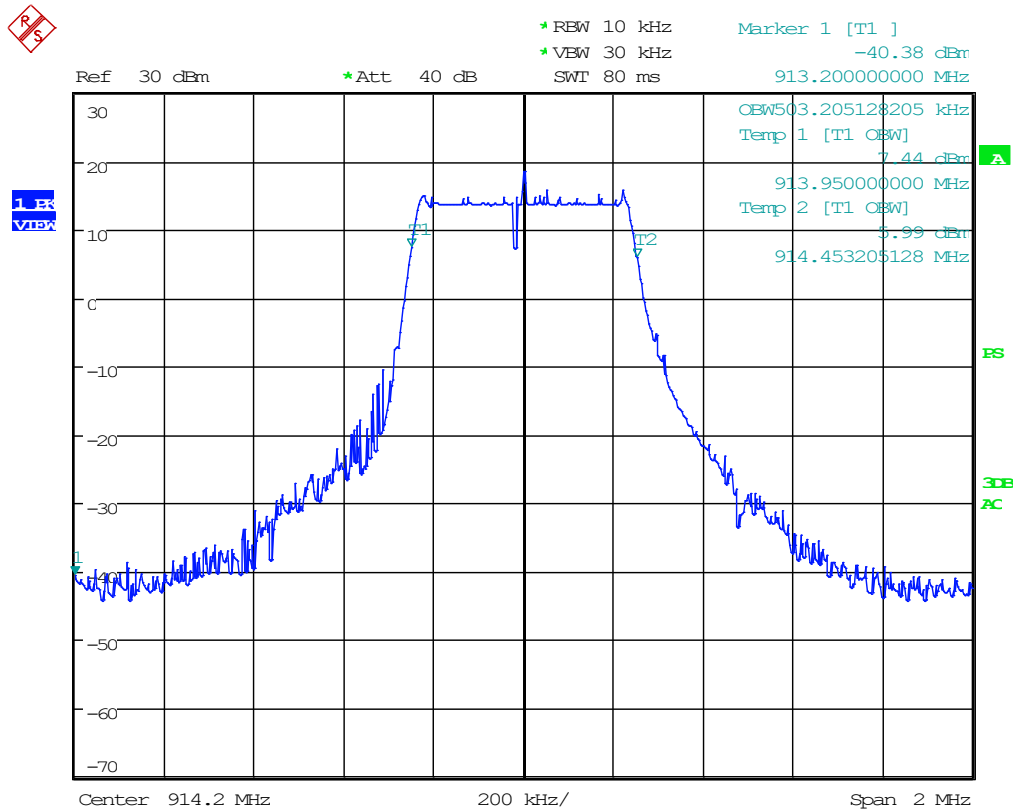
99%: Low Channel



Date: 30.JUN.2025 12:31:19

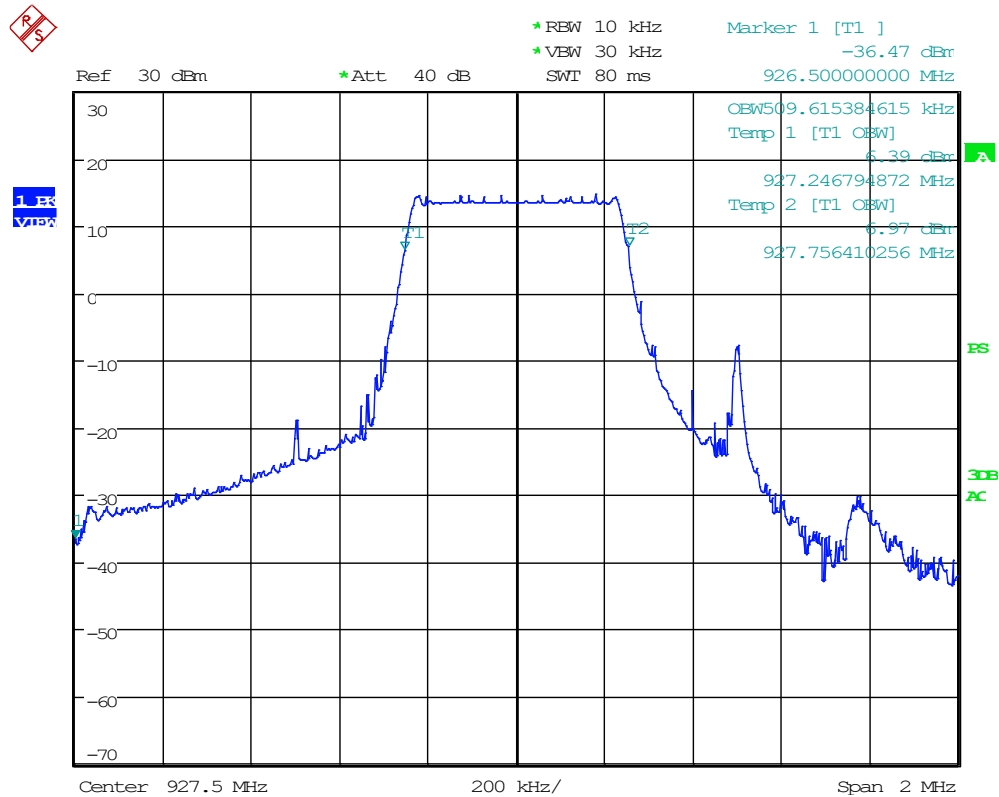


99%: Mid Channel



Date: 30.JUN.2025 12:33:14

99%: High Channel



Date: 30.JUN.2025 12:34:42



8 CONDUCTED OUTPUT POWER

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the receiver. The peak power output was measured.

8.1 Requirements:

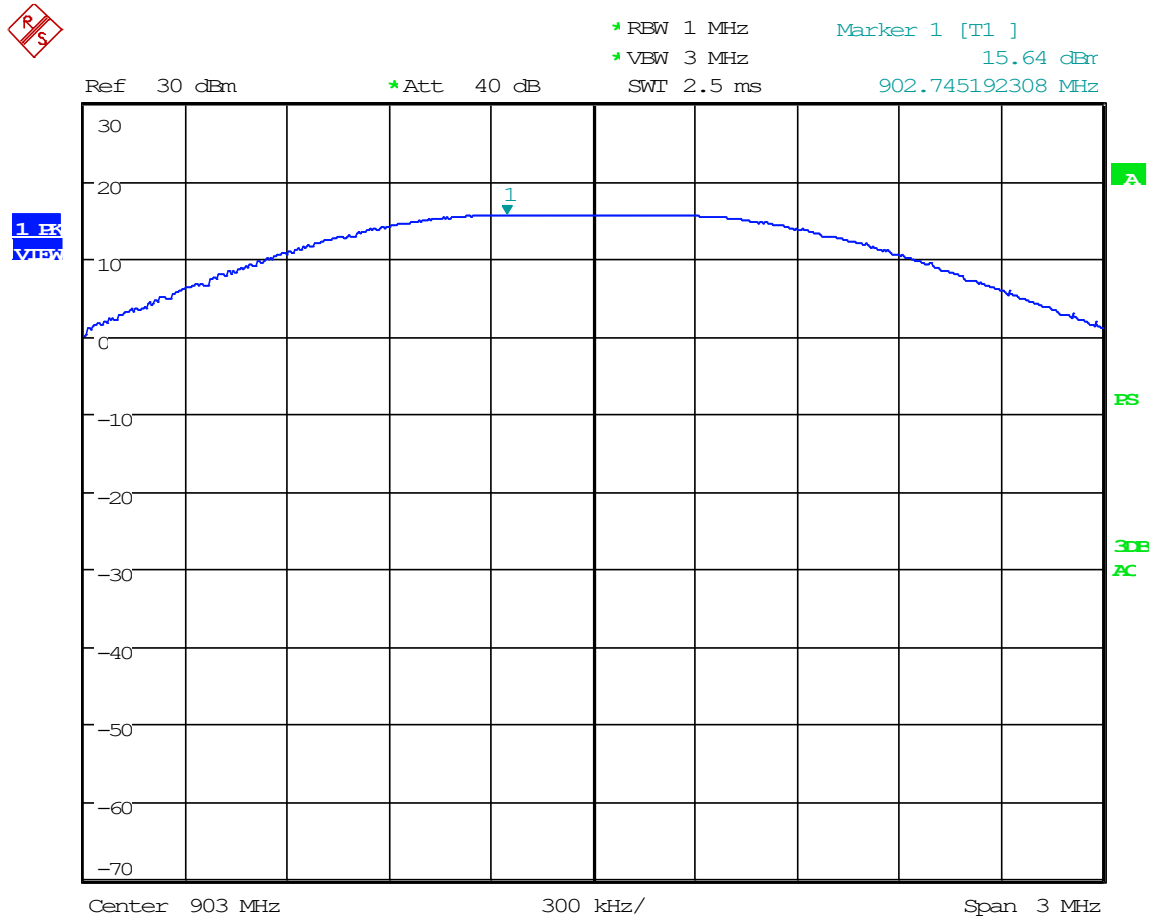
The peak power output shall be 1 watt (30 dBm) or less when using an antenna with a gain of less than 6dBi. For antennas having a gain of more than 6dBi, the limit is reduced by 1dB for every dB the antenna gain is over 6dBi.



8.2 Conducted Output Power Test Data

Test Date:	2025-06-09 to 2025-07-01	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(b)(3); KDB558074	Air Temperature:	22.0°C
		Relative Humidity:	52%

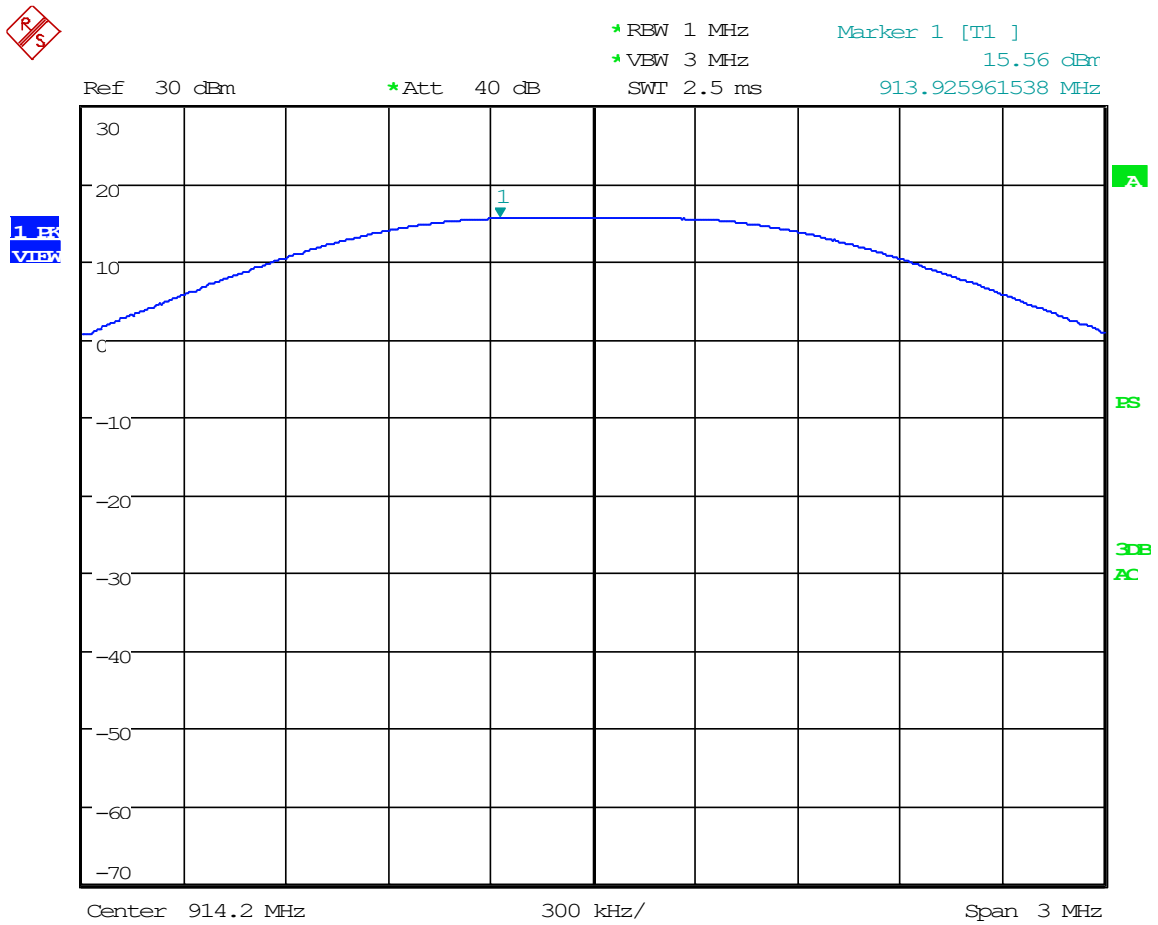
Low Channel



Date: 1.JUL.2025 10:38:46



Mid Channel



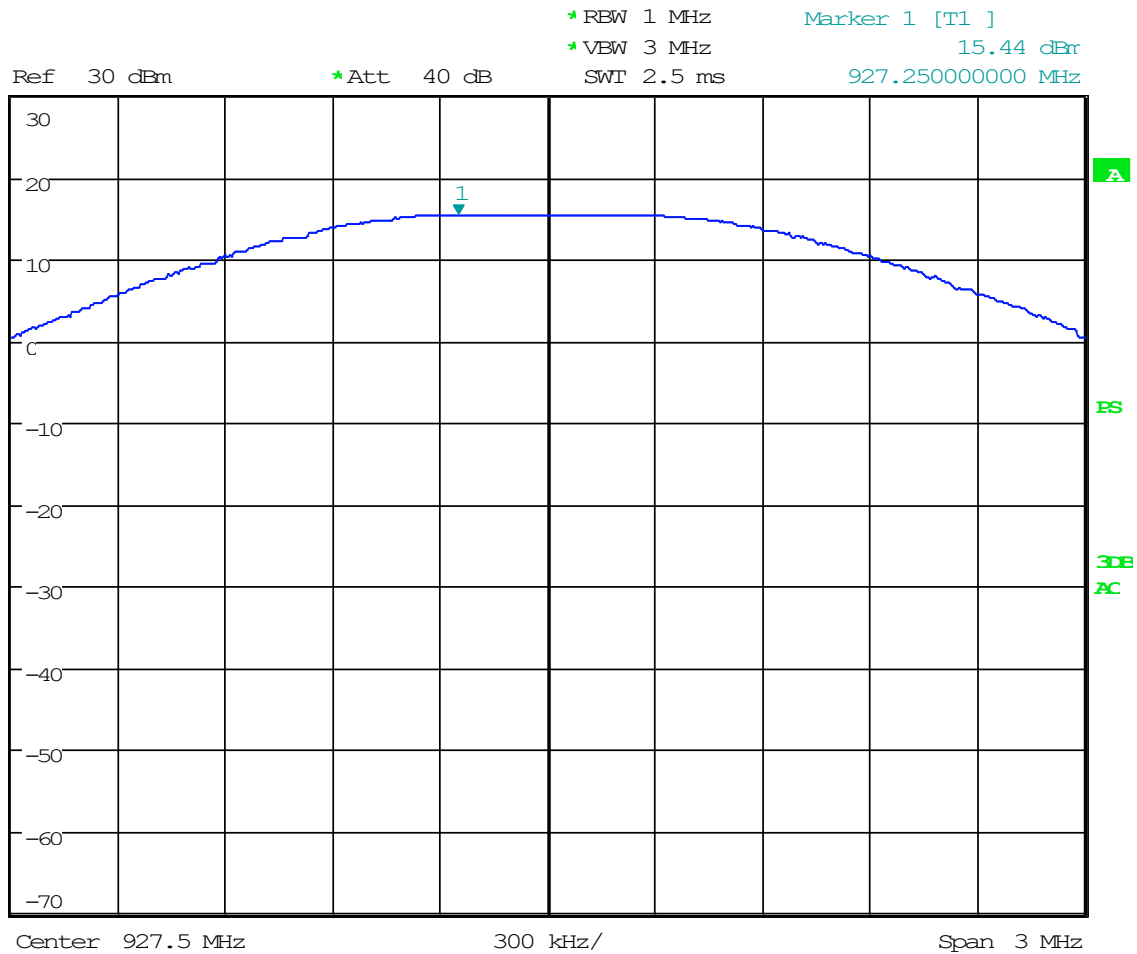
Date: 1.JUL.2025 10:38:02



High Channel



1 PK
VIEW



Date: 1.JUL.2025 10:36:59



9 CONDUCTED SPURIOUS EMISSIONS

The following tests were performed to demonstrate compliance.

RF Antenna Conducted Test

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the spectrum analyzer.

9.1 Requirements:

All Spurious Emissions must be at least 20dB down from the highest emission level measured within the authorized band up through the tenth harmonic.

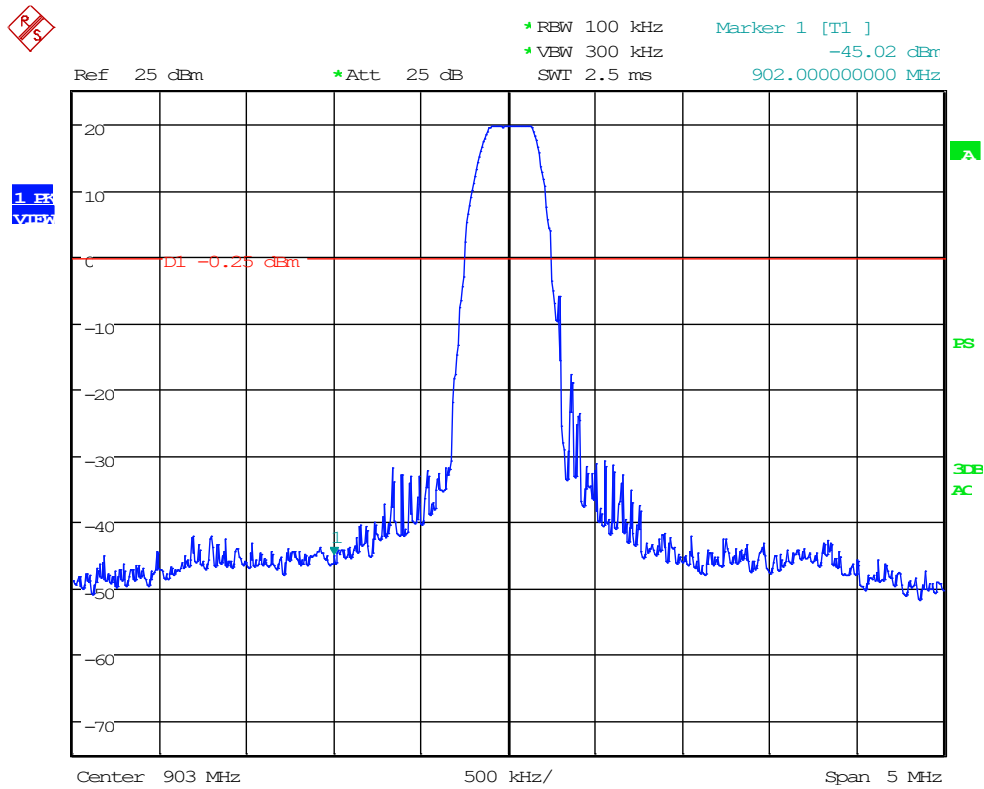
Spurious emissions measurements were made at the low, mid, and upper channels with the appropriate spectrum analyzer impulse bandwidth. Additionally, 20dB down points were measured for the low and high channels to verify band edge compliance.



9.2 Conducted Spurious Emissions Test Data

Test Date:	2025-06-19	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074	Air Temperature:	22.0°C
Results:	Complies	Relative Humidity:	52%

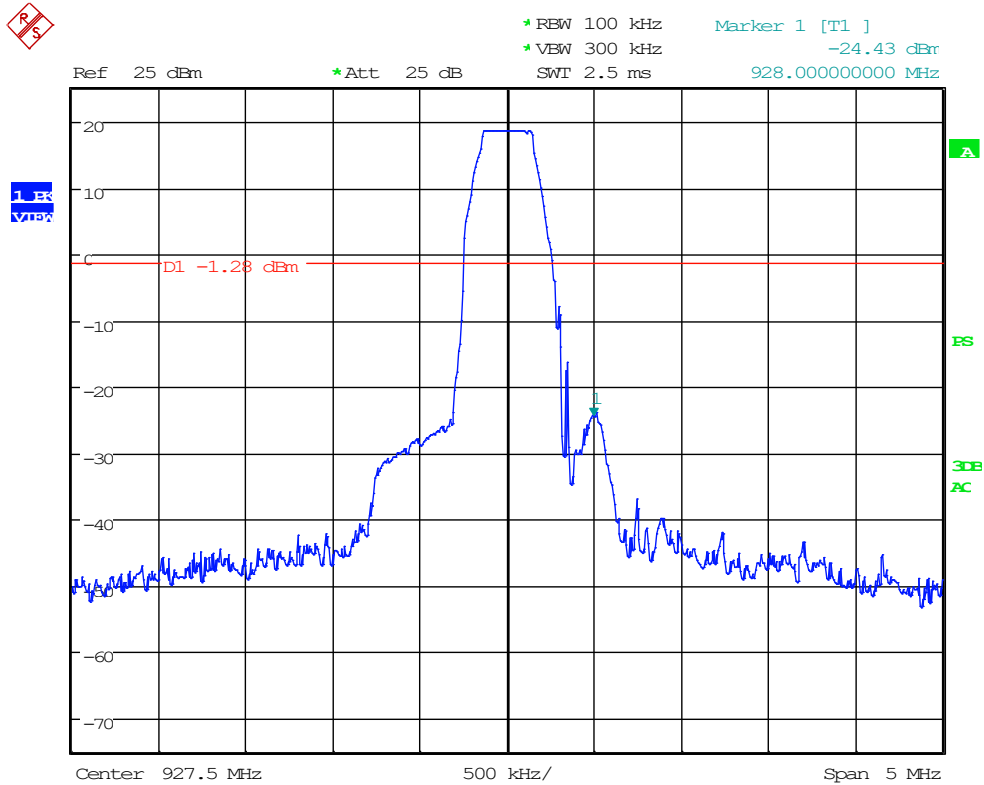
Low Band Edge



Date: 19.JUN.2025 15:50:45



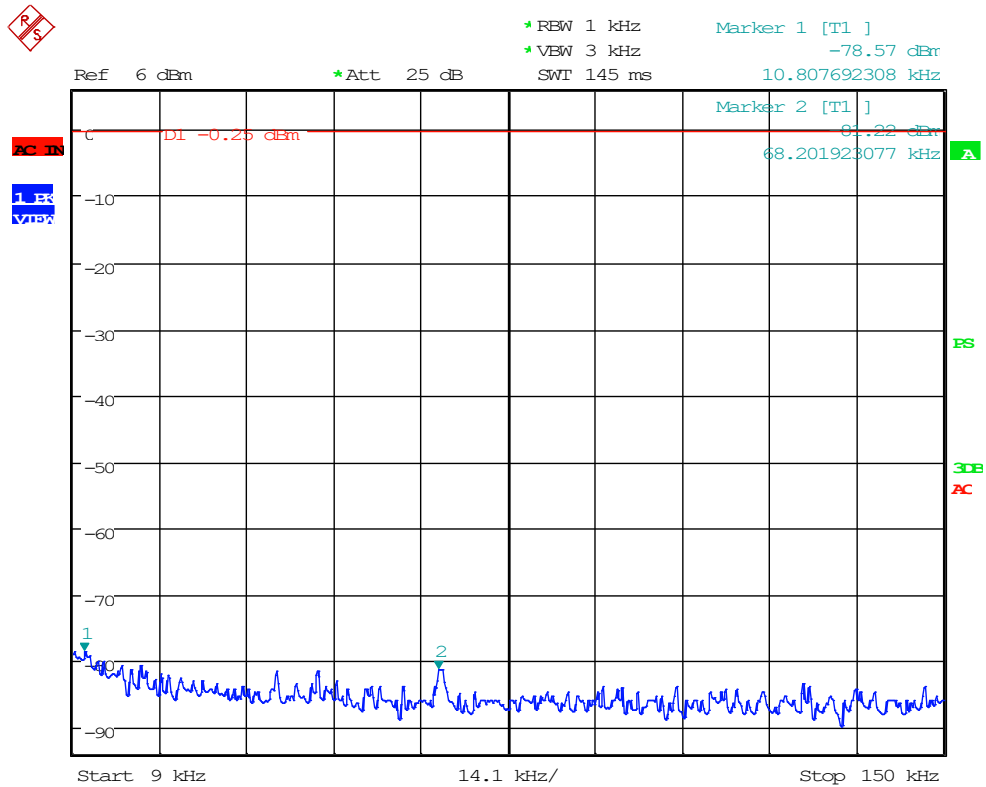
Upper Band Edge



Date: 19.JUN.2025 16:02:44



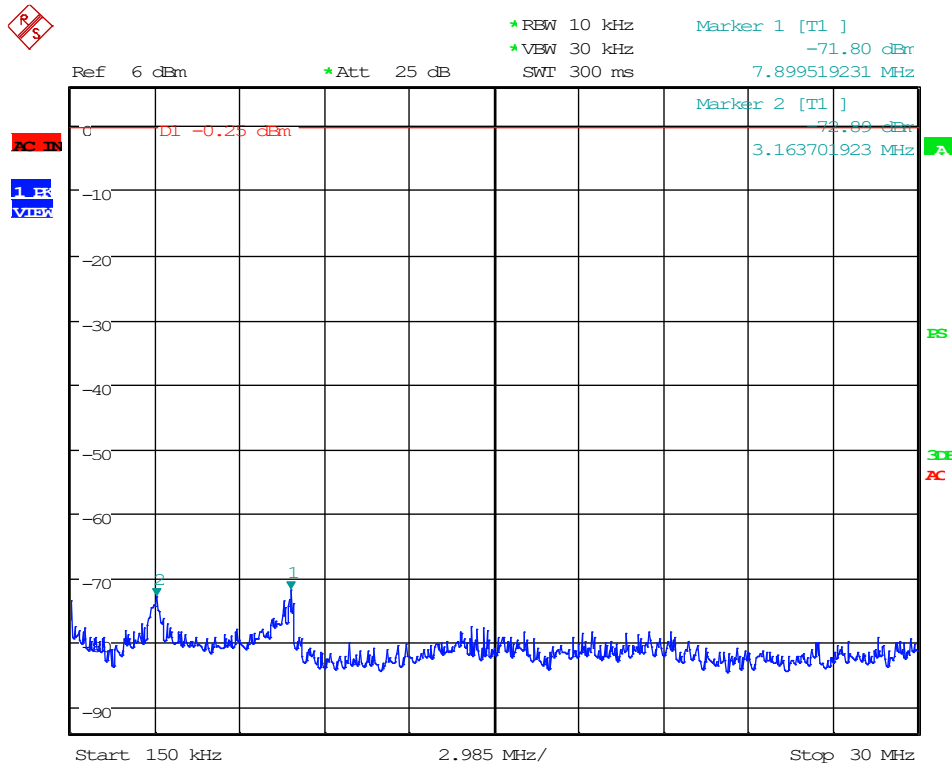
Low Channel: 0.009 MHz to 0.15 MHz



Date: 19.JUN.2025 15:51:44



Low Channel: 0.15 MHz to 30 MHz



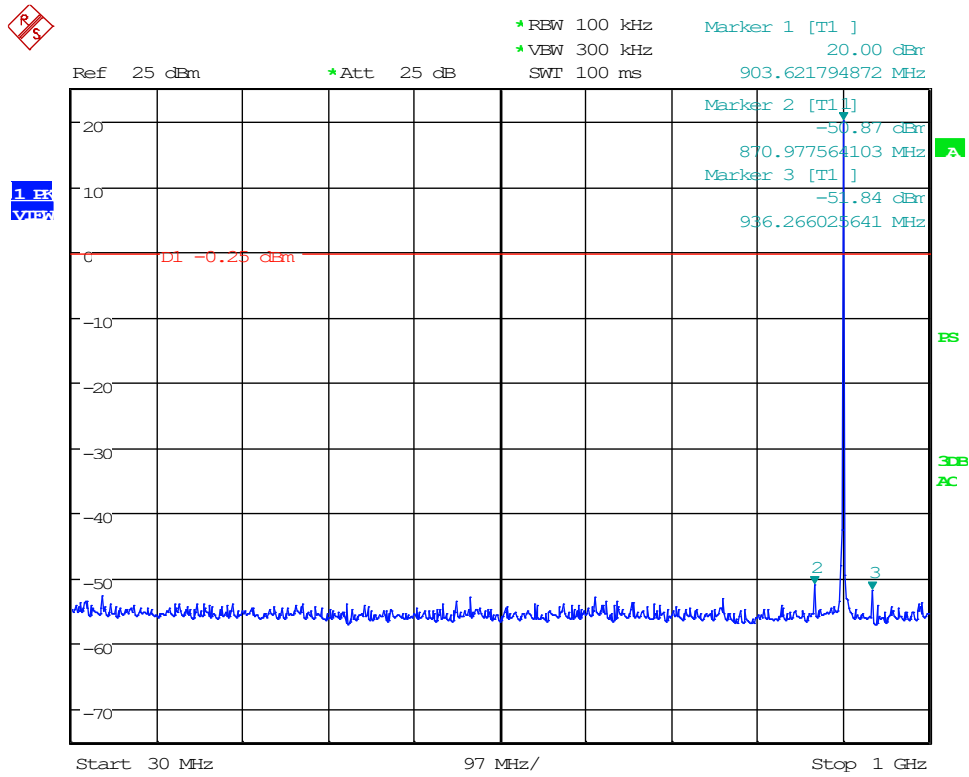
Date: 19.JUN.2025 15:52:29



Order No(s): F2P34169B

Applicant: QRC Technologies, A Parsons Company
Model: BlueFly

Low Channel: 30 MHz to 1000 MHz



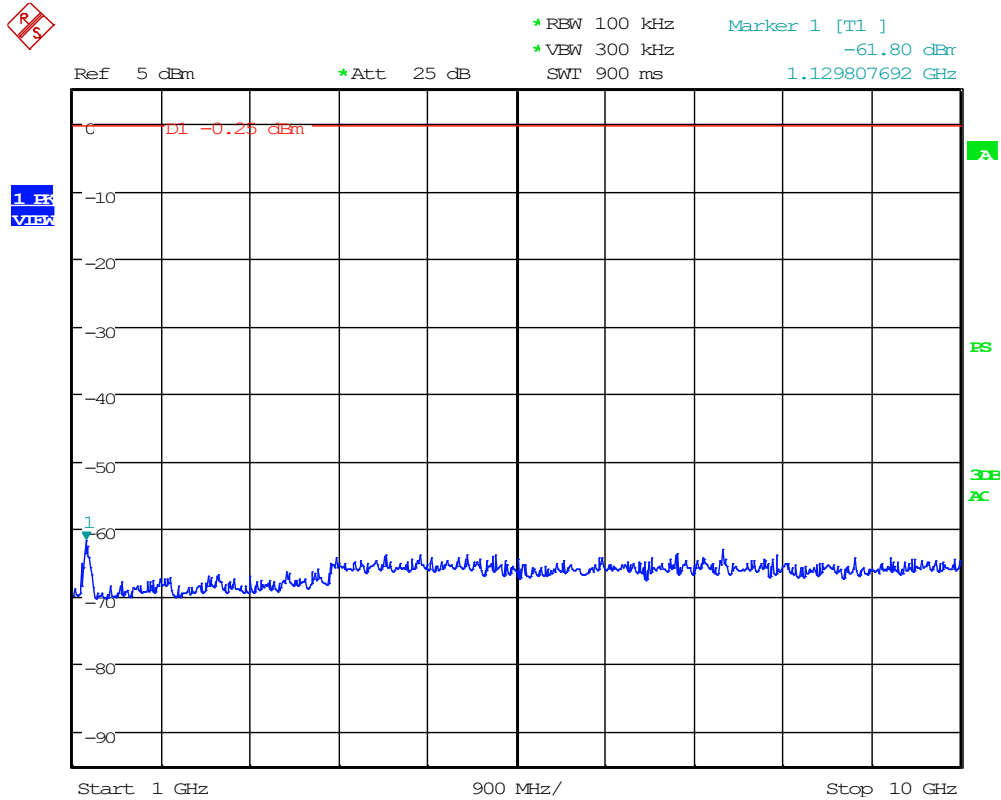
Date: 19.JUN.2025 15:53:29



Order No(s): F2P34169B

Applicant: QRC Technologies, A Parsons Company
Model: BlueFly

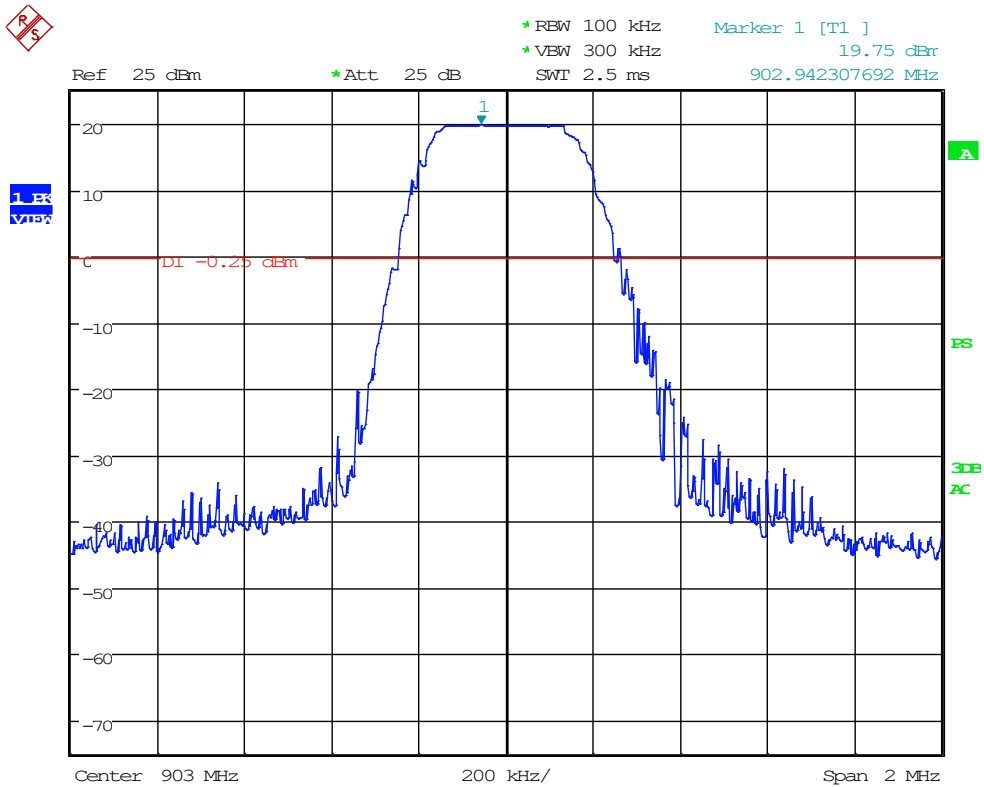
Low Channel: 1 GHz to 10 GHz



Date: 19.JUN.2025 15:54:00



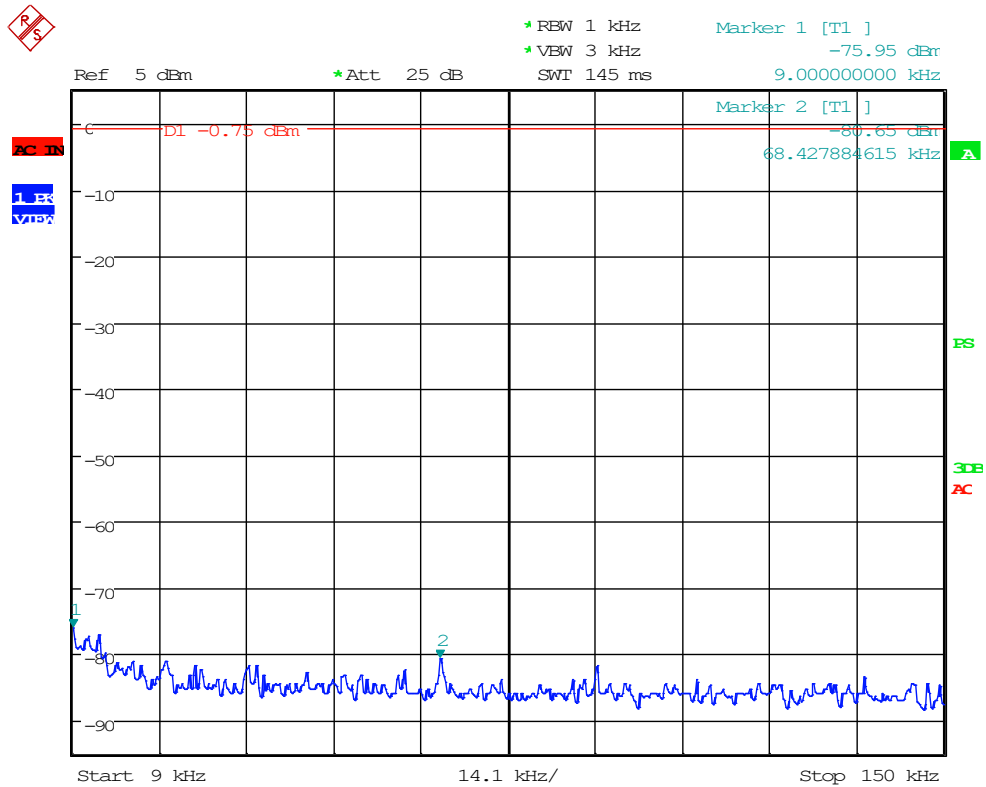
Low Channel: Spur Reference



Date: 19.JUN.2025 15:49:11



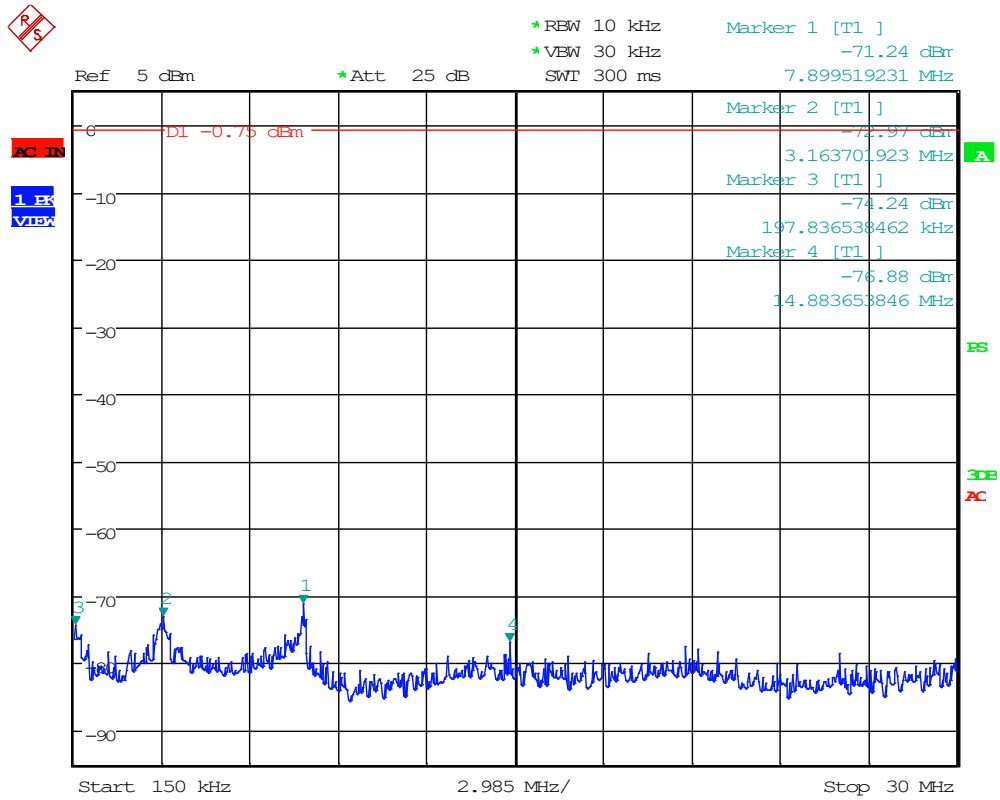
Mid Channel: 0.009 MHz to 0.15 MHz



Date: 19.JUN.2025 15:56:32



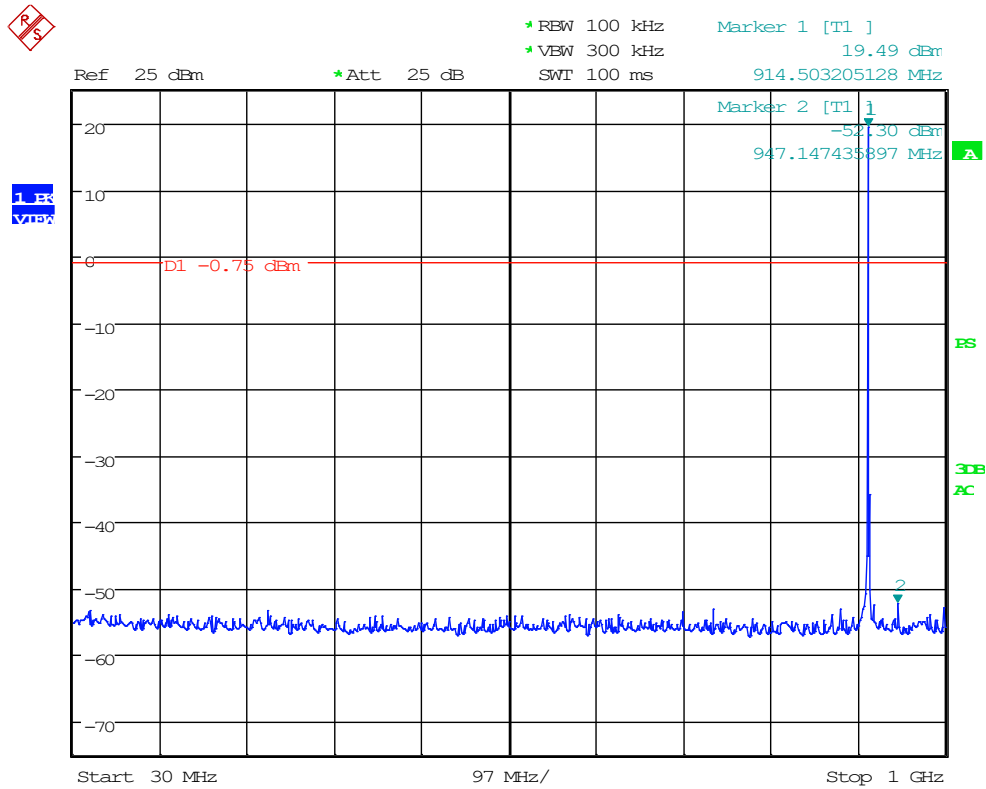
Mid Channel: 0.15 MHz to 30 MHz



Date: 19.JUN.2025 15:57:38



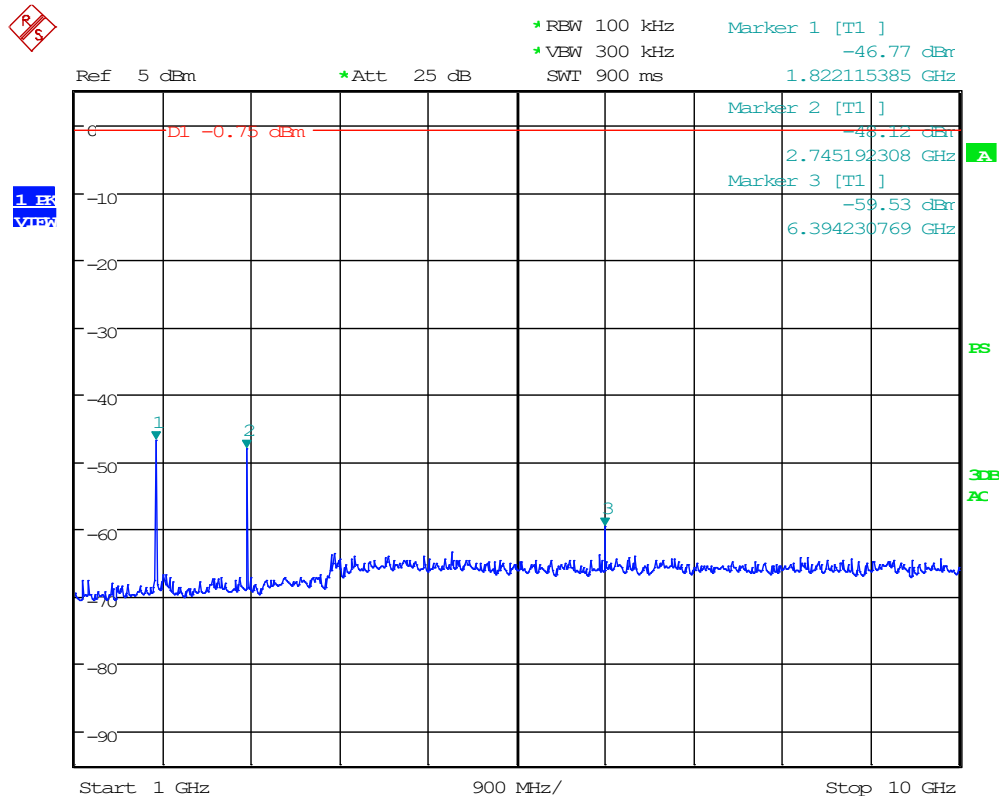
Mid Channel: 30 MHz to 1000 MHz



Date: 19.JUN.2025 15:58:35



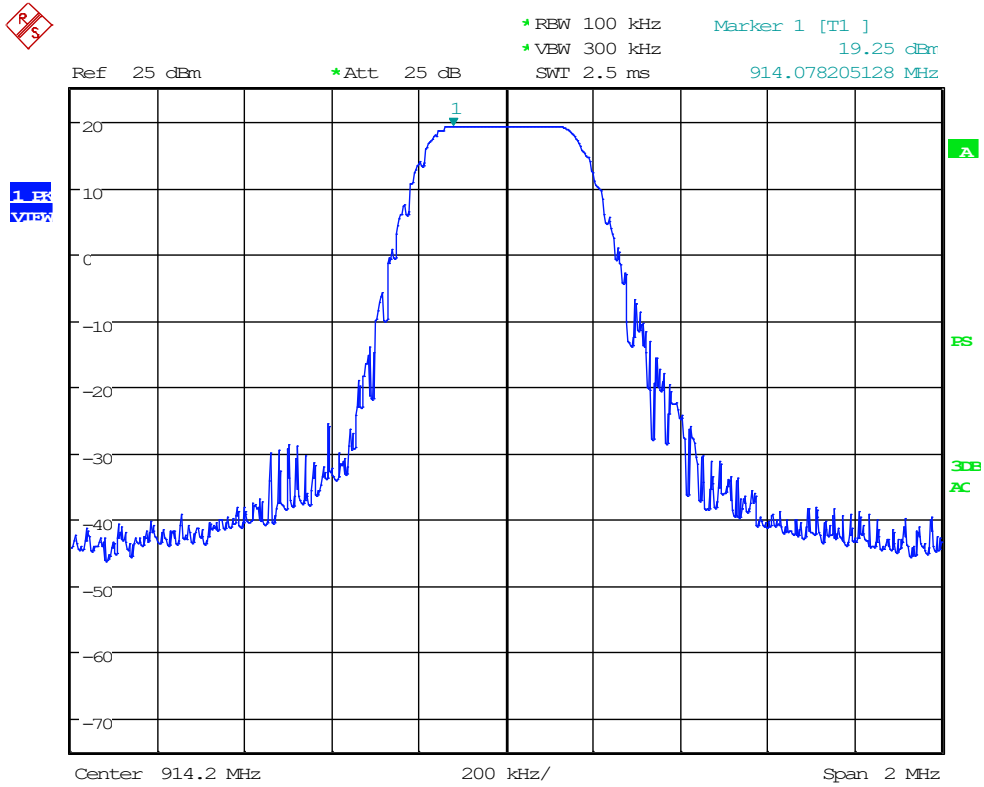
Mid Channel: 1 GHz to 10 GHz



Date: 19.JUN.2025 16:00:21



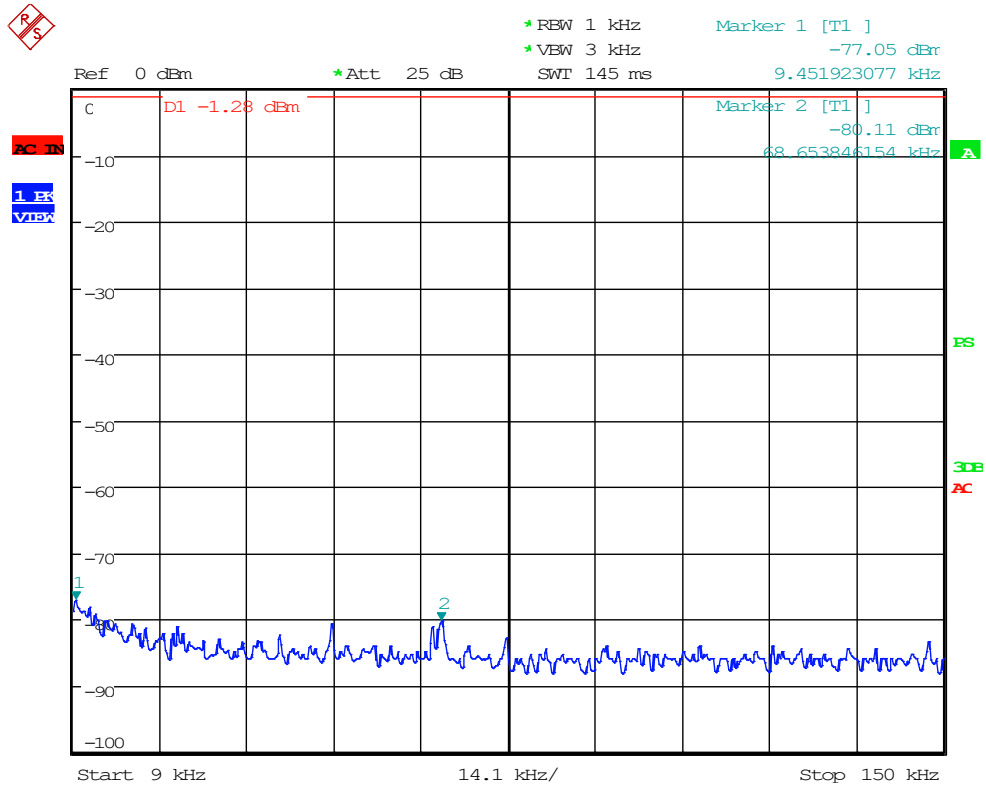
Mid Channel: Spur Reference



Date: 19.JUN.2025 15:55:24



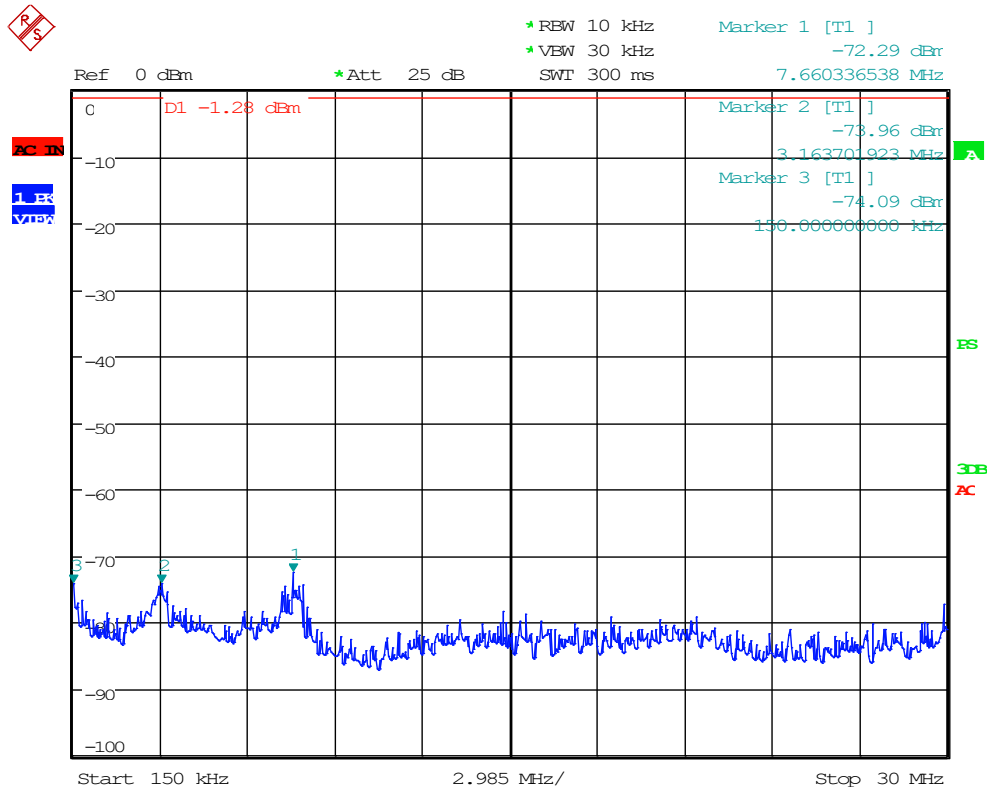
High Channel: 0.009 MHz to 0.15 MHz



Date: 19.JUN.2025 16:03:26



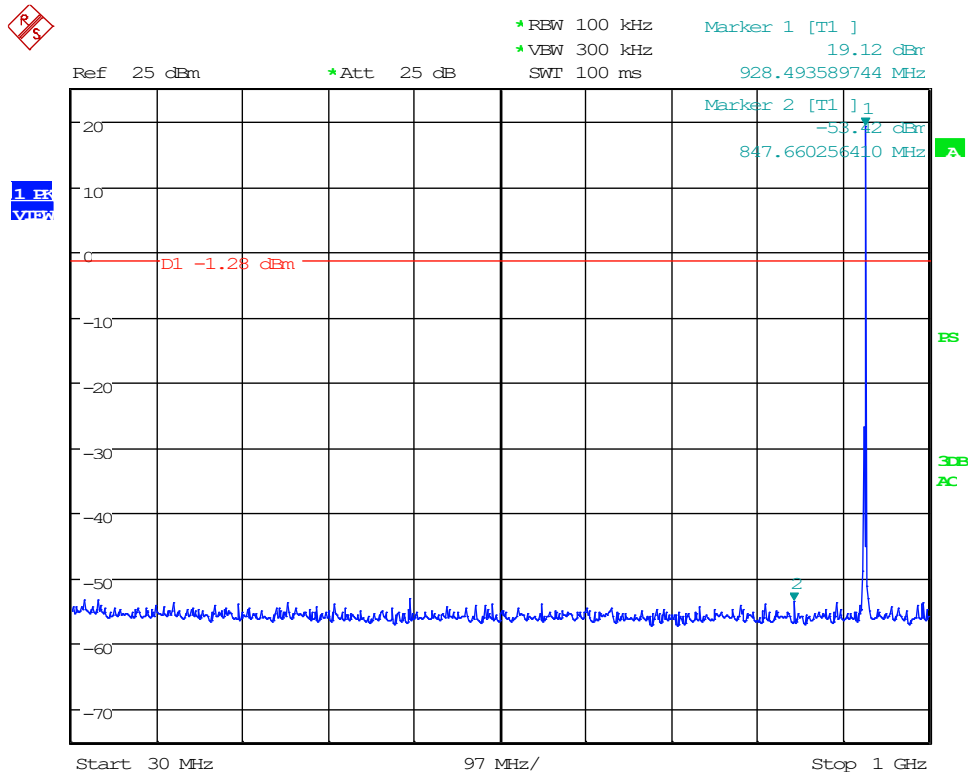
High Channel: 0.15 MHz to 30 MHz



Date: 19.JUN.2025 16:04:10



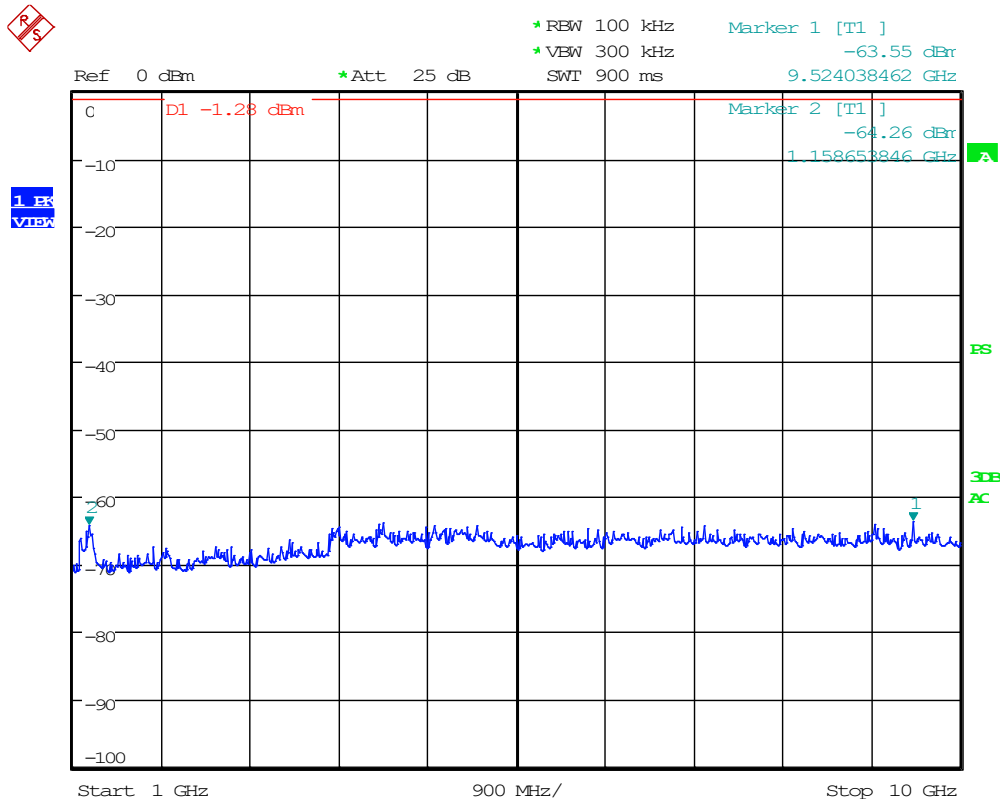
High Channel: 30 MHz to 1000 MHz



Date: 19.JUN.2025 16:05:08



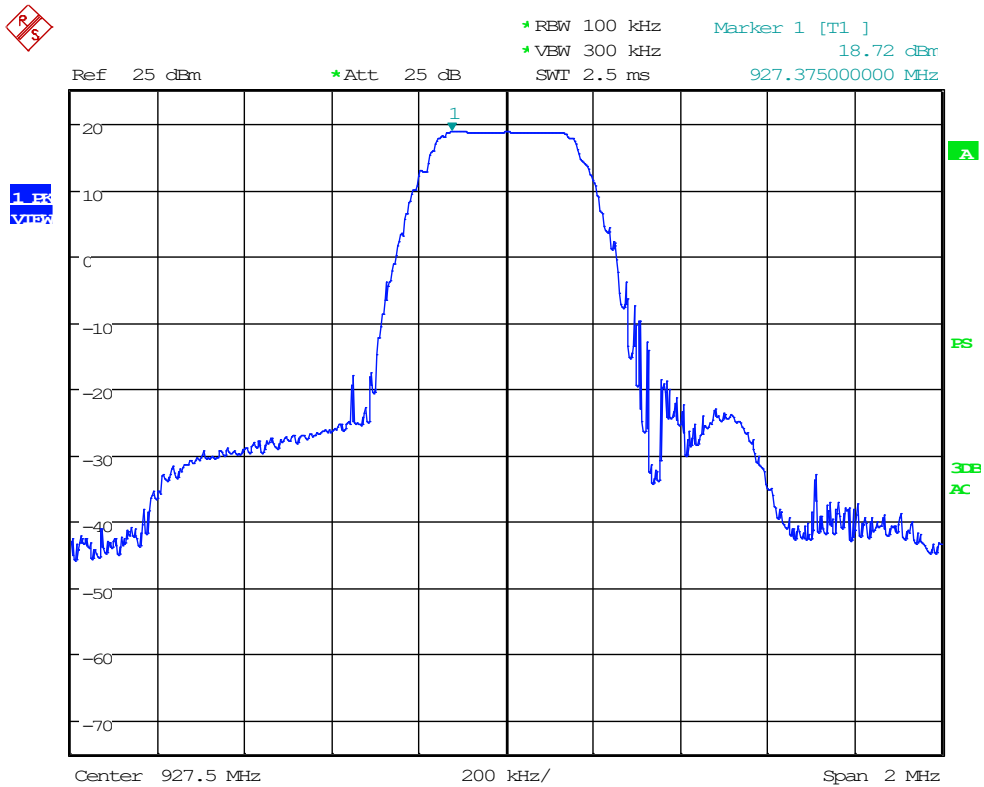
High Channel: 1 GHz to 10 GHz



Date: 19.JUN.2025 16:05:39



High Channel: Spur Reference



Date: 19.JUN.2025 16:01:53



10 RADIATED SPURIOUS EMISSIONS

The EUT antenna port was fitted with its -1.73dBi gain Integral Antenna. Radiated emissions were measured in a Semi-Anechoic Chamber. All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

10.1 Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).

Scans were performed from 9kHz to 10 GHz at the low, mid, and high channels and the high channel was determined to be the worst case. The tables of measured results follow in data presented and include measurements from all channels.



10.2 Radiated Spurious Emissions Test Data

Test Date(s):	2025-06-19 to 2025-07-01	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	Air Temperature:	21.0°C
		Relative Humidity:	36%

Notes: Plots are peak, max hold prescan data included only to determine what frequencies to investigate and measure. The EUT was initially placed in a semi-anechoic chamber and rotated in all three orthogonal positions to maximize the emissions. Characterization measurements were then performed to determine at which frequencies significant emissions occurred. These graphs are shown below.

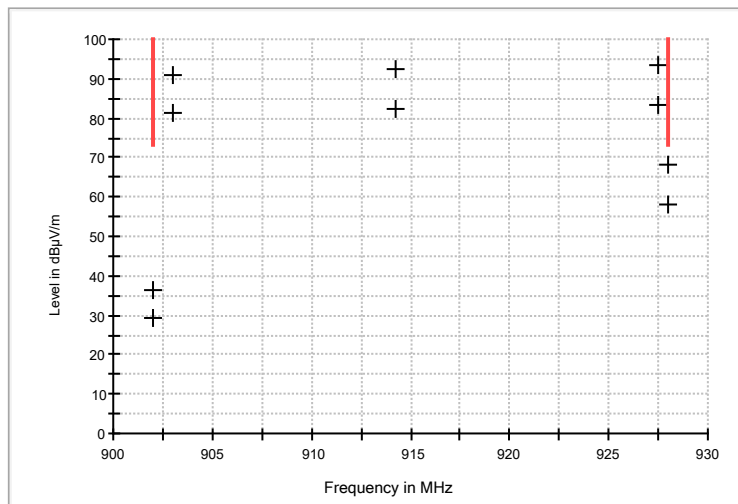
The equipment was fully exercised with all cabling attached to the EUT and was positioned on the Semi-Anechoic Chamber for maximum emissions. While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength. The tables of measured results can be found below.

Some of the frequencies did not change with the EUT on or off. At those frequencies, the test distance was shortened to 1 meter and still no emissions from the EUT were visible or over the ambient or limit.

In the following plots, the black line indicates ambient noise and the red line indicates the measurement with the EUT on. Emissions to be found by the EUT were measured and listed in tables. The plots are for reference only and the limit lines are not actual limit lines but merely a guide.

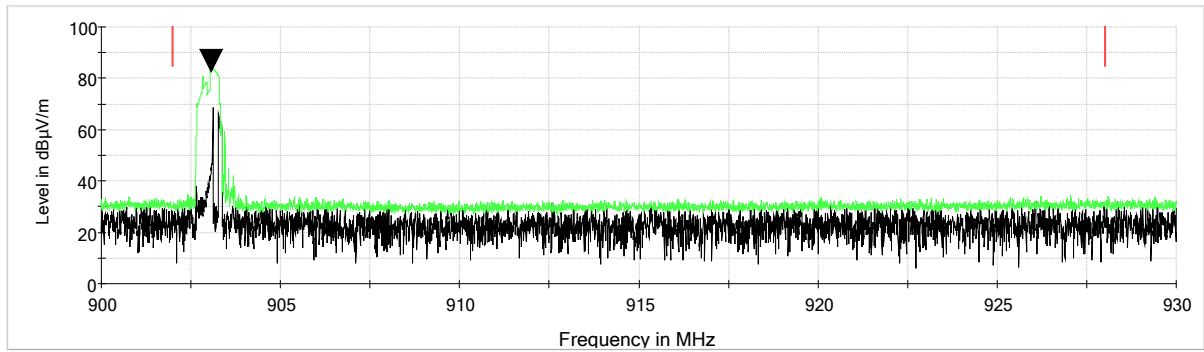
**Measurements: Band Edges**

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
902.000000	36.2	120.000	130.0	V	135.0	-13.6	37.2	73.4
902.000000	29.5	120.000	200.0	H	0.0	-13.6	43.9	73.4
903.000000	81.3	120.000	200.0	H	0.0	-13.6		
903.000000	90.7	120.000	130.0	V	135.0	-13.6		
914.200000	92.2	120.000	120.0	V	285.0	-13.3		
914.200000	82.3	120.000	200.0	H	350.0	-13.3		
927.500000	83.3	120.000	200.0	H	225.0	-12.9		
927.500000	93.4	120.000	130.0	V	190.0	-12.9		
928.000000	57.9	120.000	200.0	H	225.0	-12.9	15.5	73.4
928.000000	68.2	120.000	130.0	V	190.0	-12.9	5.2	73.4

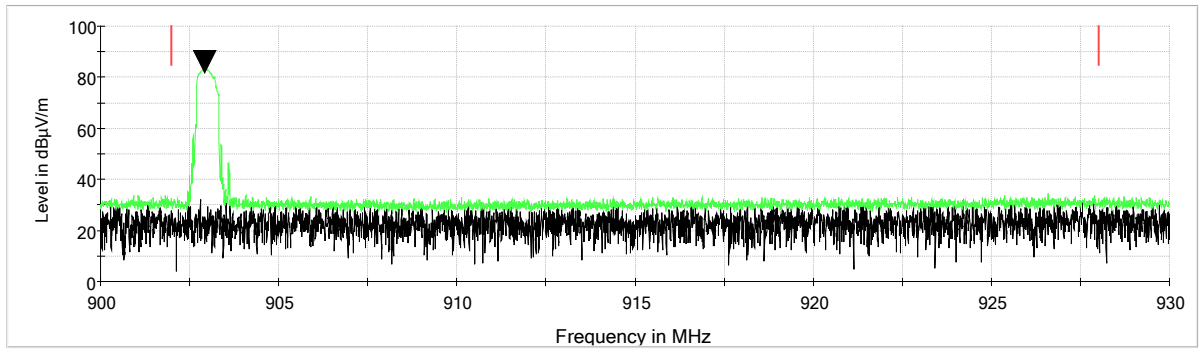




Low Channel – Vertical

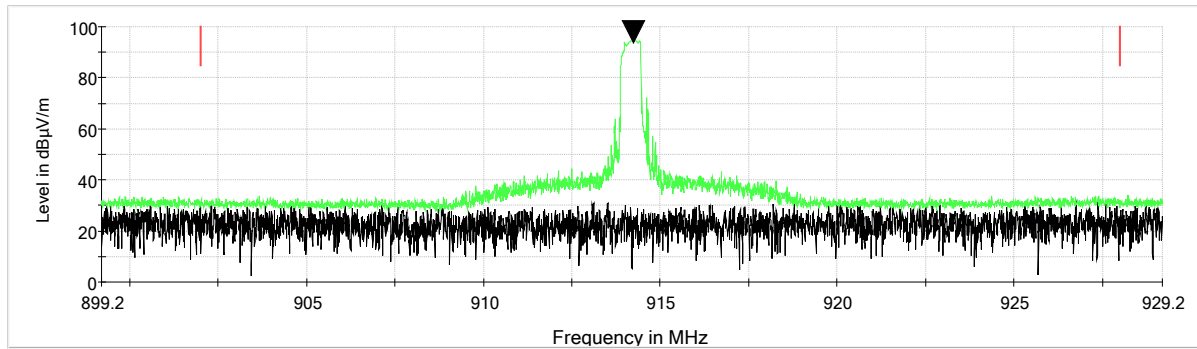


Low Channel – Horizontal

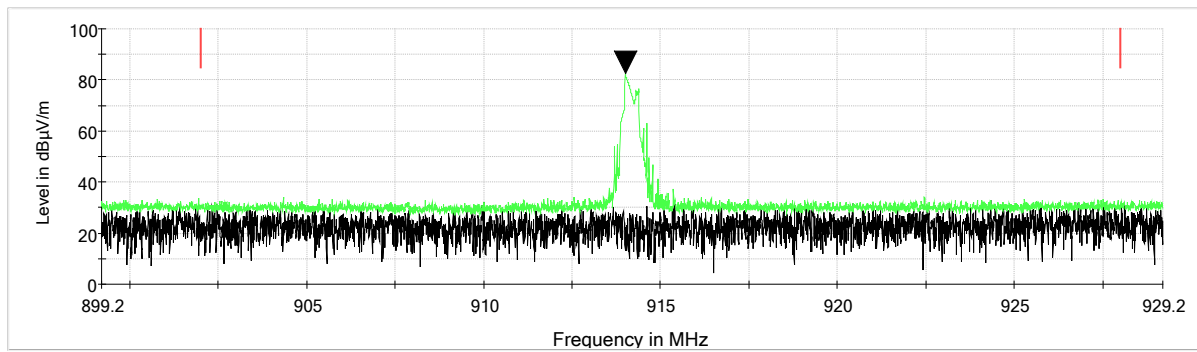




Mid Channel – Vertical

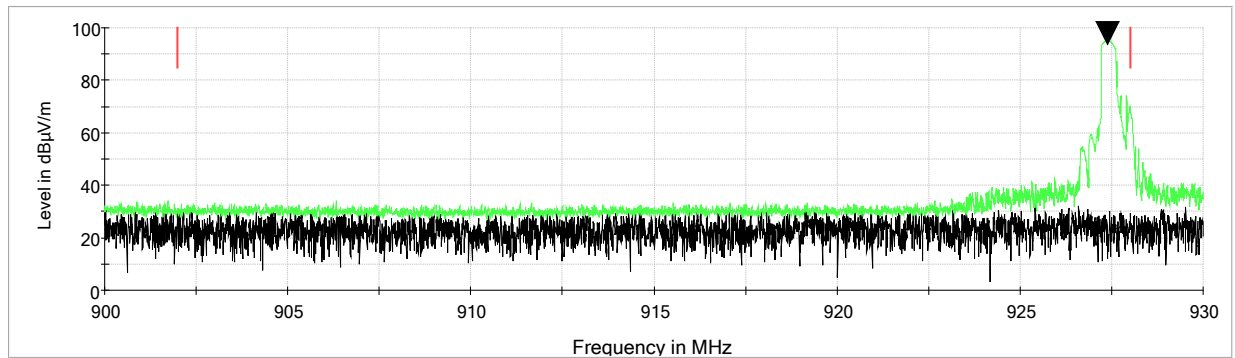


Mid Channel – Horizontal

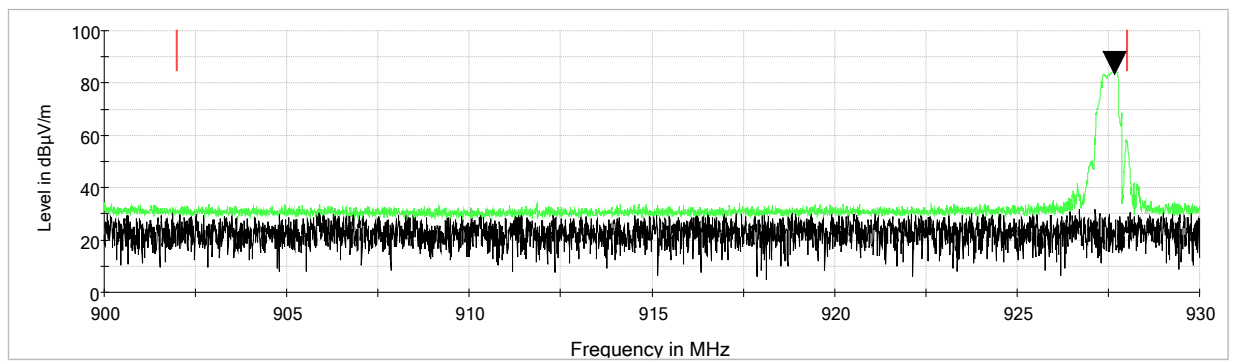


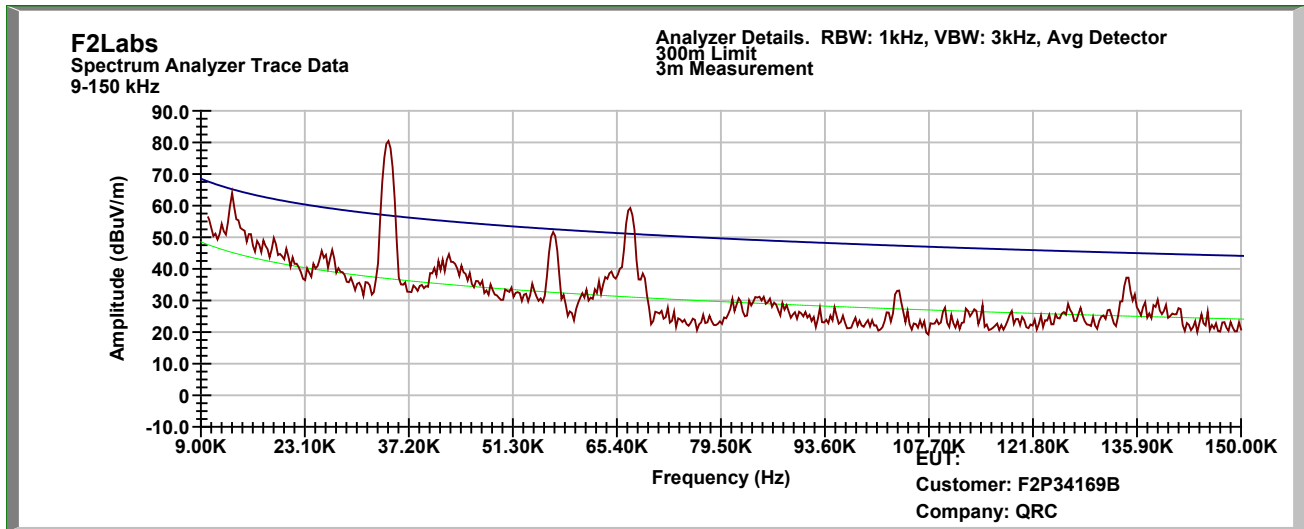


High Channel – Vertical

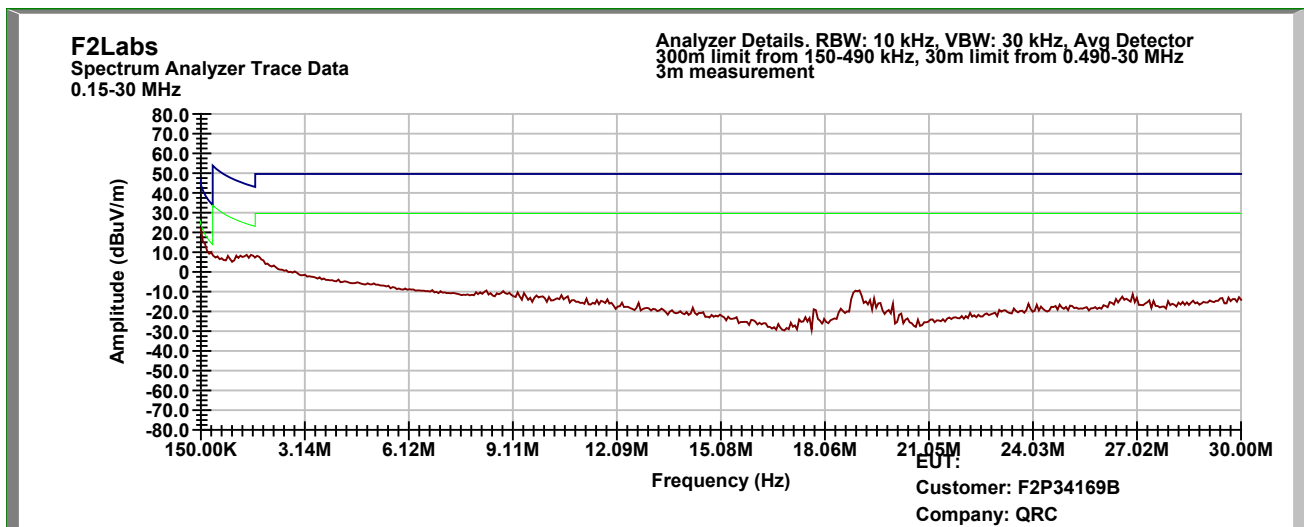


High Channel – Horizontal



**Radiated Spurious Emissions: 0.009 MHz to 0.15 MHz**

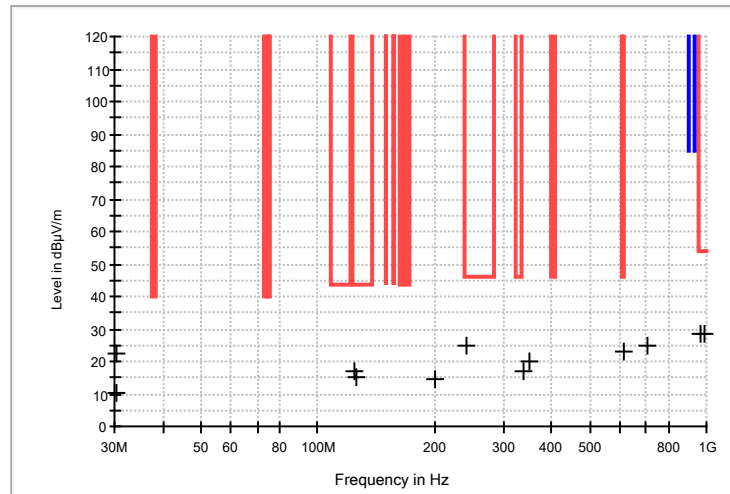
Note: Limits are specified at a 300m reference distance, while measurements are conducted at 3m. In accordance with 47 CFR § 15.31(f)(2), measurement results are adjusted by 40dB per decade (totaling 80dB for the two-decade difference). Although some measured emission traces appear to exceed the 300m limit when viewed directly, they are in fact well below the specified limit after applying the appropriate extrapolation correction.

Radiated Spurious Emissions: 0.15 MHz to 30 MHz



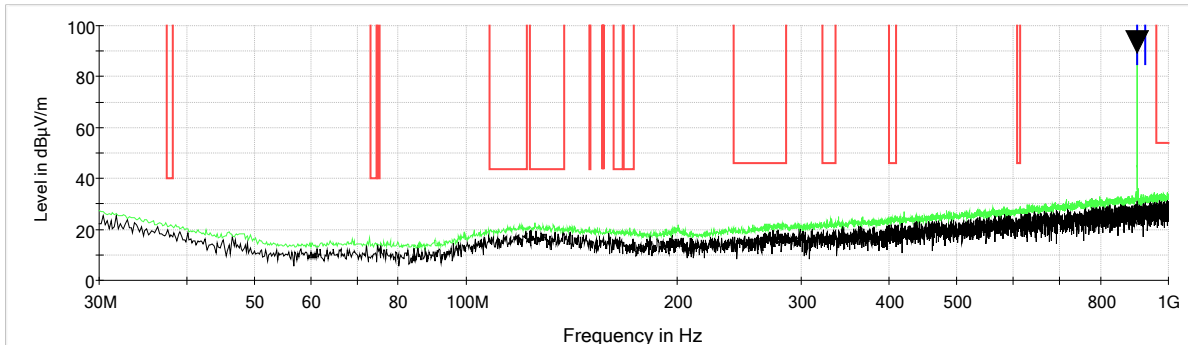
Measurements: 30 MHz to 1000 MHz

Frequency (MHz)	QuasiPeak (dBμV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV/m)
30.388000	22.3	120.000	200.0	H	0.0	-19.4	157.7	180.0
30.388000	10.3	120.000	100.0	V	0.0	-19.4	169.7	180.0
123.896000	17.1	120.000	200.0	H	0.0	-25.5	26.4	43.5
125.254000	15.1	120.000	100.0	V	3.0	-25.5	28.4	43.5
200.332000	14.5	120.000	100.0	V	0.0	-26.1	165.5	180.0
241.654000	24.6	120.000	200.0	H	8.0	-26.8	21.4	46.0
338.848000	17.3	120.000	100.0	V	0.0	-24.2	162.7	180.0
350.100000	19.9	120.000	200.0	H	355.0	-23.9	160.1	180.0
615.686000	22.8	120.000	100.0	V	0.0	-19.1	157.2	180.0
702.210000	24.8	120.000	200.0	H	0.0	-17.5	155.2	180.0
971.288000	28.6	120.000	200.0	H	0.0	-11.9	25.4	54.0
984.674000	28.2	120.000	100.0	V	0.0	-11.6	25.8	54.0

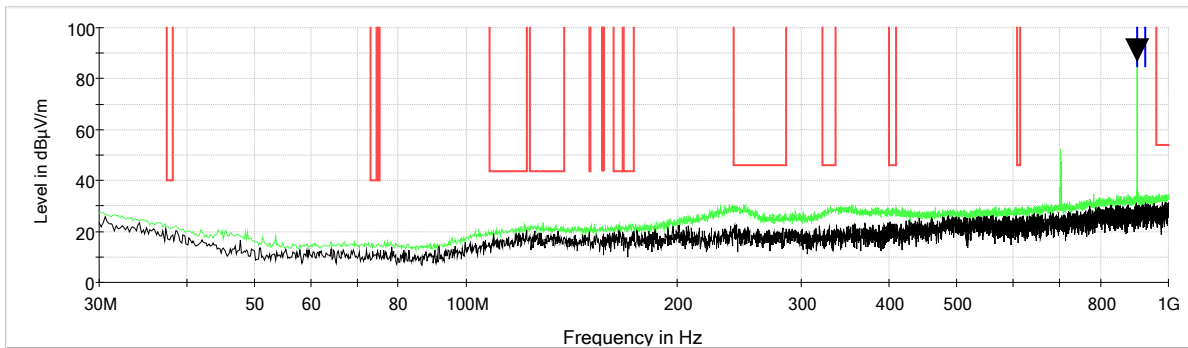




Radiated Spurious Emissions: 30 MHz to 1000 MHz - Vertical



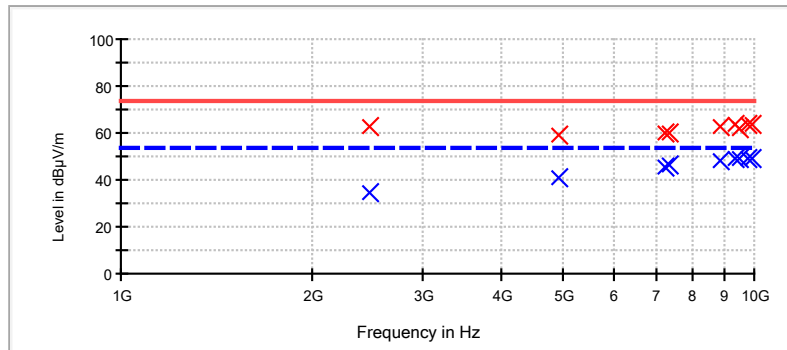
Radiated Spurious Emissions: 30 MHz to 1000 MHz - Horizontal





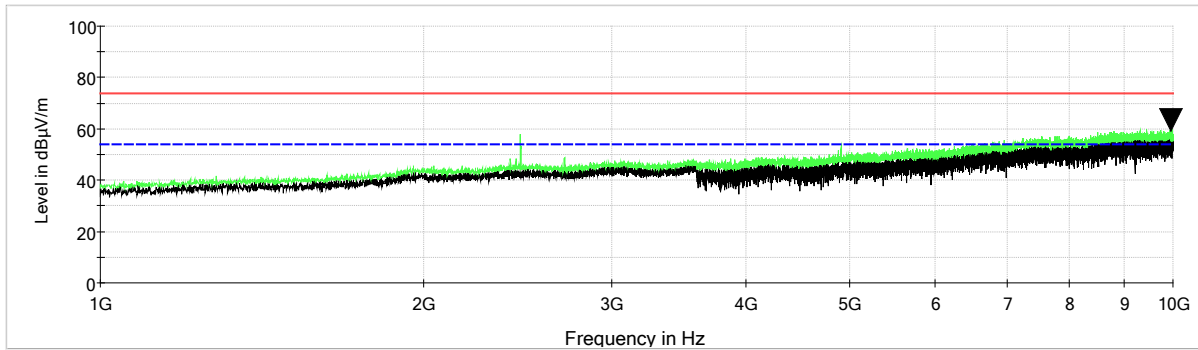
Measurements: Greater Than 1 GHz

Frequency (MHz)	MaxPeak (dB μ V/m)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - AVG (dB)	Limit - AVG (dB μ V/m)	Comment
2461.600000	62.4	34.7	1000.0	1000.000	150.0	V	0.0	7.8	19.3	54.0	
4904.200000	59.2	40.8	1000.0	1000.000	150.0	V	1.0	12.7	13.2	54.0	
7252.300000	60.0	45.8	1000.0	1000.000	150.0	V	353.0	18.7	8.2	54.0	
7350.400000	59.9	46.3	1000.0	1000.000	150.0	H	0.0	19.1	7.7	54.0	
8870.500000	63.0	48.3	1000.0	1000.000	150.0	H	0.0	21.2	5.7	54.0	
9347.500000	63.8	49.3	1000.0	1000.000	150.0	H	0.0	22.1	4.7	54.0	
9442.000000	62.1	49.1	1000.0	1000.000	150.0	V	0.0	21.9	4.9	54.0	
9807.400000	63.5	49.3	1000.0	1000.000	150.0	H	348.0	22.1	4.7	54.0	
9955.900000	63.5	49.4	1000.0	1000.000	150.0	V	31.0	22.3	4.6	54.0	

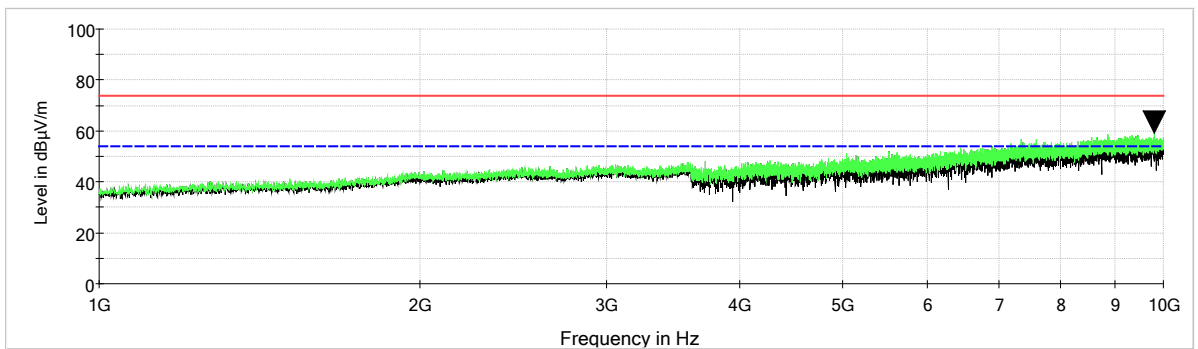




Radiated Spurious Emissions: 1 GHz to 10 GHz - Vertical



Radiated Spurious Emissions: 1 GHz to 10 GHz - Horizontal





11 PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

11.1 Requirements:

The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

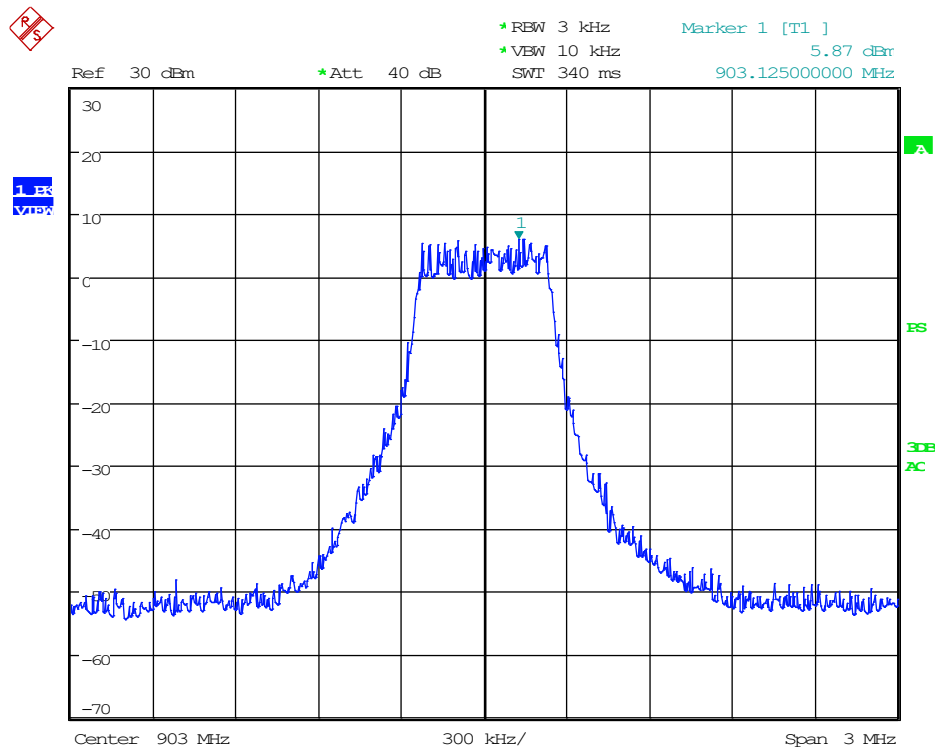
Power spectral density measurements were performed at a resolution bandwidth of 3 kHz (video bandwidth set at 10 KHz). The peak spectral densities were measured at the low, mid, and upper channels.



12.2 Peak Power Spectral Density Test Data

Test Date(s):	2025-07-01	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(e); KDB558074	Air Temperature:	22.0°C
		Relative Humidity:	52%

Low Channel



Date: 1.JUL.2025 09:30:05



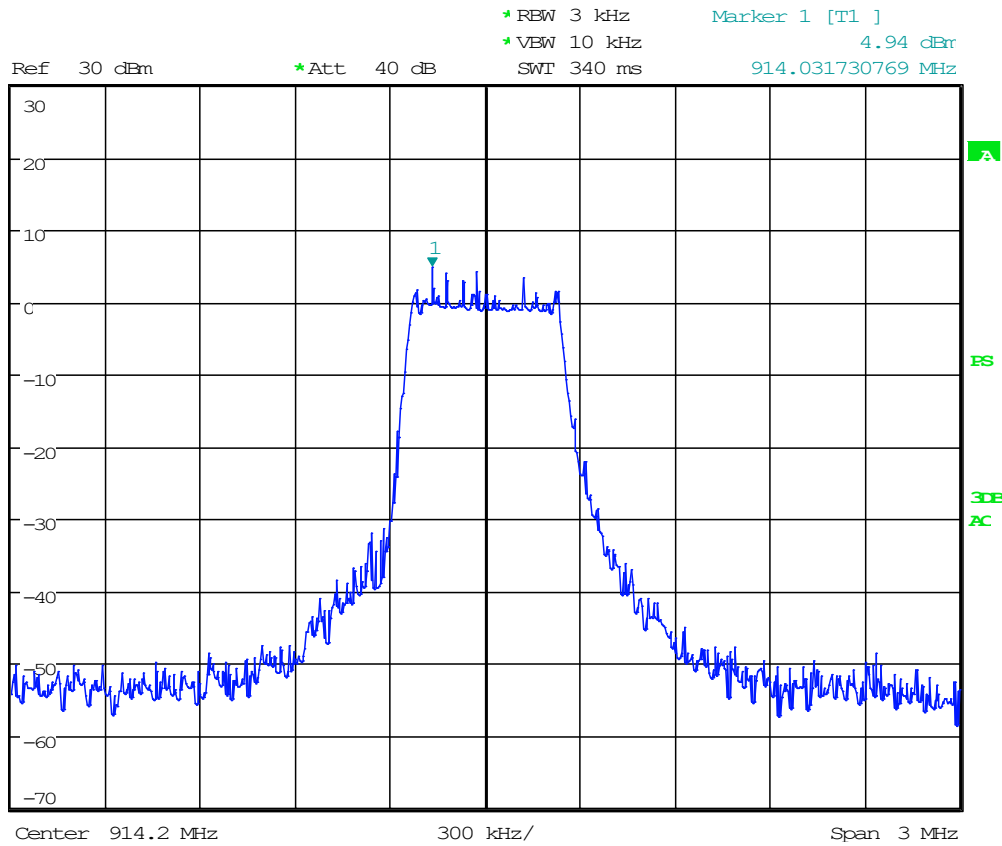
Order No(s): F2P34169B

Applicant: QRC Technologies, A Parsons Company
Model: BlueFly

Mid Channel



1.E3
V197



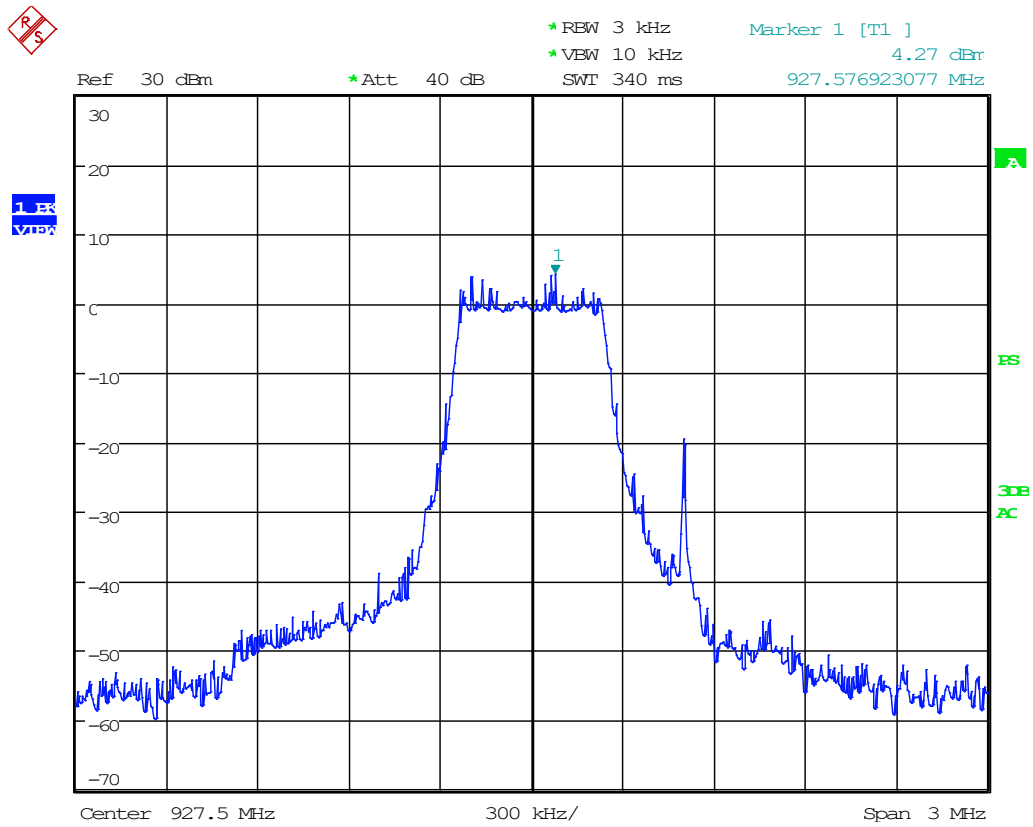
Date: 1.JUL.2025 09:31:38



Order No(s): F2P34169B

Applicant: QRC Technologies, A Parsons Company
Model: BlueFly

High Channel



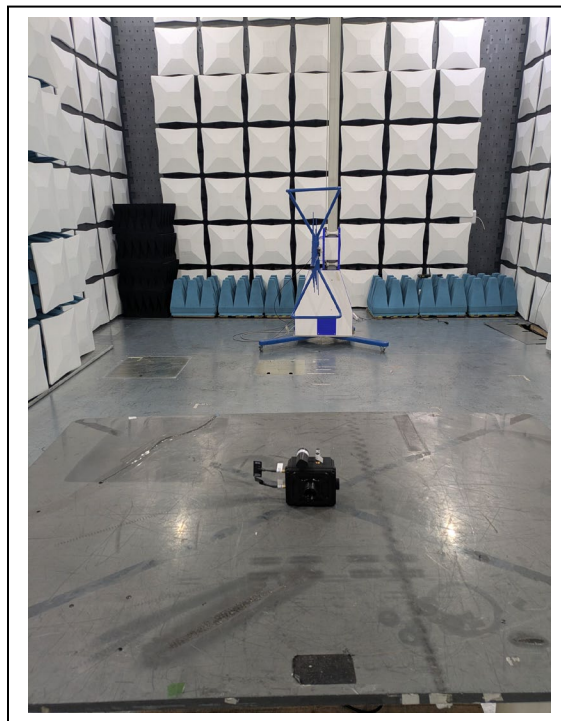
Date: 1.JUL.2025 09:32:37

12 TEST SETUP PHOTOGRAPH(S)

Radiated Spurious Emission: 0.009 MHz to 30 MHz



Radiated Spurious Emission: 30 MHz to 1000 MHz



Radiated Spurious Emission: Greater than 1 GHz**Conducted Output Power, Peak Power Spectral Density,
Occupied Bandwidth, and Conducted Spurious Emissions**